Regional Information Report No. 4K07-5

Salmon Operational Plans for the Chignik Area, 2007

by

Mark A. Stichert

and

Heather Finkle

April 2007

Alaska Department of Fish and Game **Division of Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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SALMON OPERATIONAL PLANS FOR THE CHIGNIK AREA, 2007

by

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April 2007

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by

Mark A. Stichert

March 2007

Alaska Department of Fish and Game **Division of Commercial Fisheries**

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east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
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CHIGNIK WEIR FACILITY OPERATIONAL PLAN

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ABSTRACT

The Chignik River weir facility supports a combination of fishery management, weir support, salmon research, and aviation staff from approximately May 1 to September 15 annually. Due to its remote location, the facility must provide and maintain its own power, water, septic, communication, and transportation systems. This document provides facility staff with a detailed summary as well as season startup and shut down procedures for each of these systems.

Key words: Chignik Management Area, Chignik River, ADF&G, sockeye salmon, *Oncorhynchus nerka*, weir, operational plan, salmon management.

INTRODUCTION

The Chignik Management Area (CMA) encompasses all coastal waters and inland drainages of the northwest Gulf of Alaska between Kilokak Rocks and Kupreanof Point on the Alaska Peninsula (Figure 1). The CMA includes approximately 110 salmon producing streams and several large lakes. Of these, the Chignik River system is one of the largest sockeye *Oncorhynchus nerka* and Chinook salmon *O. tschawytscha* producers on the Alaska Peninsula.

In 1922, a weir was installed on Chignik River, located approximately 2 miles south of Chignik Lake (Figure 2). Since this date, the weir has been operated annually to support the CMA commercial salmon fisheries. Daily escapement estimates produced at the weir are used by the Alaska Department of Fish and Game (ADF&G) to evaluate the run strength and timing of sockeye salmon returning to the Chignik River system. Commercial salmon fishing opportunities are primarily based on these escapement estimates such that enough sockeye salmon are allowed to reach local spawning grounds while allowing for commercial harvest of the remaining surplus salmon.

Five villages (Chignik Lake, Chignik Lagoon, Chignik Bay, Perryville, and Ivanof) heavily rely on the Chignik River system for commercial and subsistence fishing needs. On average, commercial salmon fishing in the Chignik Management Area contributes between 5 to 10 million dollars annually to local area economies. The Chignik River weir and its associated facility is the primary tool for managing and providing commercial and subsistence salmon fishing opportunities for these villages.

Over the years the facility has grown both in size and scope. The facility currently supports a combination of fishery management, weir support, salmon research, and aviation staff from approximately May 1 to September 15. Due to its remote location, the facility must provide and maintain its own power, water, communication, and transportation systems. This document provides Chignik weir staff with a detailed overview of these major mechanical systems as well as general crewmember guidelines for day to day operations.

CHIGNIK WEIR FACILITY

SITE PLAN

The Chignik weir facility is composed of five primary buildings (Figure 3). The manager's/office building (bldg # 4), pilot's house (bldg. # 5) and bunkhouse (bldg # 7) house facility personnel and families. The maintenance shop (bldg. # 6) contains facility maintenance equipment and supplies, the scale laboratory, and additional living quarters

for visitors. The generator shed (bldg. # 8) contains the facility's generators and associated equipment. The lower level of the pilot's house also serves as the dive shop, outboard shop, and sampling gear storage. The lower level of the bunkhouse is additionally used to house the limnology lab, research staff, and for food storage. Common areas including the greenhouse (bldg. # 2) and banya (bldg # 1) are located on the north end of bulkhead. The all terrain vehicle (ATV) shed (bldg # 12) is located across from the weir facility on the south side of Chignik River. Laundry facilities are located in the office building for permanent staff and in the bunkhouse for support and research staff.

At any given time, 3 to 20 people live and work at the weir facility. The Area and Assistant Area Management Biologists as well as the department pilot and their families have private residences. Weir and research staff share living quarters in the bunkhouse. Common areas, including the greenhouse, banya, yard/gardens, maintenance shop, exercise equipment, fish cleaning table, gillnet, and smoker are shared equally among all facility occupants. However, some commons areas (i.e. greenhouse) contain personal belongings and supplies. When using these areas, please communicate with others and respect personal property.

SEASON STARTUP AND SHUT DOWN

The weir facility is typically opened each spring by research staff and shut down each fall by management staff. Because the same personnel are not present during each of these operations it is important to be thorough and consistent. Following are the general guidelines and order of operations for opening and closing weir facility. Detailed procedures for each of the major mechanical systems are outlined in their respective sections later in this document.

Season Startup

- Contact Willard Lind (winter caretaker) at 907-845-2234 several weeks and immediately prior to arrival to obtain keys and arrange for transport to the facility.
- Open window shutters and unlock doors. Most shutters are permanently fixed to each building and only need to be unscrewed, opened, and reattached with wood screws in the open position. Any shutters or door covers not permanently attached need to be removed, clearly labeled (exact location), and stacked neatly in the wood shed under the pilot house. Clearly label all padlocks removed and place in the manager's office.
- Check fuel levels, open lines, and start generator (see page 6).
- Remove covers from office electronics, connect, and turn on radios.
- Move fire pump onto bulkhead and prepare for use (see page 19).
- Setup water system (see page 10).
- Start bunkhouse refrigerators, hot water heater, and oil stove.
- Charge cordless tool and 12 volt (boat/generator/bobcat) batteries.
- Move and plug in bunkhouse (lower level) freezers.

- Move fuel drums, propane tanks, and dollies from bunkhouse to pad in front of the generator shed.
- Attach hoist winches/lines to booms.
- Setup phone system (see page 17).
- Setup skiffs (see page 12).
- Move ATV to landing across river (ATV and shed keys on shelf in office).

Season Shut Down

The procedures for shutting down the facility are, in general, the reverse of the procedures for opening the camp. It typically takes an efficient crew (4-6 individuals) approximately 2-3 days to fully shut down the facility. Of all the procedures, winterizing the skiffs/outboards and water system are the two most time consuming and detailed operations.

Small crew size (2-3 individuals), unknown damage, weather, limited access, and time constraints constantly work against those opening the facility each spring. Thus, it is important to consider these factors during shut down. In addition to the detailed procedures for closing the facility, the following points should be taken into consideration:

- Allow unobstructed access to and within the maintenance shop, generator shed, bunkhouse, outboard shop, and office.
- Leave all tools and equipment necessary (flashlights, hand and power tools, batteries and chargers, plumbing supplies, hoists, etc) for opening the facility readily accessible.
- Ensure there is sufficient fuel (all types) to fully operate the facility for 3-4 weeks after opening.
- Clean and vacuum all interior areas and ensure all refrigerators and freezers are defrosted, cleaned, and propped open.
- Unplug and cover all electronic devices.
- Stage the research weather platform as well as the smolt and tin skiffs (and outboards) such that they are the first to go back into the water at the beginning of the season.
- Elevate all items on lower level of bunkhouse 1-2 feet to prevent water damage from flooding.
- Clean barbeque grills, smoker, and dumpster thoroughly to prevent bear damage.

Winter Caretaker

Currently, Willard Lind (907-845-2234) at Chignik Lake is the caretaker for the facility when not occupied by ADF&G staff. In general, the winter caretaker's primary

responsibilities are to regularly check the weir facility, pile driver, and aircraft revetment for security purposes and address any associated maintenance needs.

FUEL

The Chignik weir facility uses five types of fuel: # 1 diesel, # 2 diesel, regular unleaded gasoline, aviation gasoline, and propane. The bulk of all fuel is typically transported to the weir facility each spring for use throughout the season. Additional fuel is purchased from Norquest Seafoods in Chignik Bay to supplement fuel levels as needed throughout the season.

#1 Diesel (heating oil) is used for Toyo stoves (building heat) and hot water heaters only. Fuel supplies for these purposes are located in five locations: **1)** red tank on deck behind bunkhouse, **2)** blue drum under pilot house in wood shed, **3)** red tank on deck behind pilot house, **4)** blue drum behind office building adjacent to water filtration system, and **5)** blue drum on north (upstream) side of office building.

Surplus #1 diesel is stored in clearly labeled 55-gallon drums in front of the generator shed.

#2 Diesel is used to run the facility power generators and pile driver. All #2 diesel is stored in the two large tanks immediately adjacent to the generator shed.

Unleaded Gasoline is used for skiff outboards, the ATV, *portable* generators, water/fire pumps, and landscaping equipment. Gas is stored in the large white tank furthest from the generator shed. Gas is supplied with a pump similar to those at gas stations.

To operate gas pump use the following procedure:

1) Switch breaker on the back wall inside generator shed labeled ‘gas tank’ to the ON position.

2) Turn switch located on the front of the tank up to the ON position.

3) Open yellow valve that supplies fuel from the tank to hose/nozzle (open door to pump housing – valve is located towards the back where the main fuel line enters the housing. The “OPEN” position is parallel with the line or pointing towards river).

4) Lift nozzle and flip handle up to ON position.

5) When finished, close both valves, turn off breaker, and record fuel amount in log book.

NOTE: There are two types of gas engines at the facility. Most skiff outboards are “4-stroke” engines and use straight unleaded gasoline. However, there are several “2-stroke” outboards as well as weedwackers and chainsaws that use a gas/2-stroke oil mix (see watercraft section - page 13). When refueling any equipment take caution and use the appropriate fuel mixture. **When in doubt, ask for assistance.**

Propane is used for kitchen stoves, clothes dryers, and barbeque grills. Propane tanks are located: **1)** behind bunkhouse [one tank], **2)** under deck between office building

and pilot house [three tanks], and **3)** behind office building [one tank]. Surplus propane is stored next to the generator shed adjacent to the tank farm.

To change propane tanks use the flowing procedure:

1) Close valve completely and unscrew brass hose fitting with crescent wrench – *remember propane fittings have opposite threads (left = tighten / right = loosen).*

2) Carefully untie rope securing tank(s) in place and remove empty tank.

3) Move full tank into position, reattach rope securing tank to wall, and reattach hose fitting/regulator (snug not tight). When attaching regulators, ensure the vent is pointed down to prevent it from filling with water or other debris.

4) Open valve completely and inspect for leaks (may hear hissing sound or detect foul odor). If a leak is detected, close valve, remove line, ensure threaded male ends are wrapped in teflon tape, check o-rings, and reattach.

Aviation Fuel is used for ADF&G aircraft only. Surplus aviation fuel is stored in labeled 55-gallon drums on the pad in front of the generator shed. Aviation fuel is transported by skiff from the weir to the ADF&G revetment at the village airstrip and pumped into a holding tank as needed.

PURCHASING AND TRANSPORTING FUEL

Throughout the field season additional fuel may need to be purchased to run the facility. Unleaded gasoline, #2 diesel, and propane can be purchased from Norquest Seafoods in Chignik Bay. Depending on supply, #1 diesel can also be purchased from Norquest, otherwise #1 can be purchased from the City of Chignik (arrange in advance 749-2280).

Up to three 55-gallon drums of fuel can be safely transported at one time using the 'Tin Skiff". At the fuel dock, evenly distribute empty drums (brought from weir) on the skiff deck in front of steering console before filling. Be sure to bring bung wench to open and close drums. If transporting propane, tightly strap cylinders upright to the rails on the gunnels to prevent them from shifting or falling. At the weir, use the drum shackle and boom hoist to lift drums from the skiff to the bulkhead.

TRANSFERRING FUEL

An electric siphon pump is used to transfer all fuel between 55-gal drums and storage areas. The pump (red with black hose) is stored in the maintenance shop. Following are the procedures for transferring fuel (i.e. pump #1 diesel from drums into holding tanks around the facility):

1) Position the source drum (and pump) as close as possible to the receiving tank using the drum dolly.

2) Remove any water or dirt that has collected on top of the source drum and open drum using bung wrench.

3) Place oil absorbing pads (located in generator shed) under the pump and stage several additional pads nearby in case of leaks.

4) Place the shorter pump hose into the source drum and the longer pump hose into the receiving tank.

5) Make sure the pump switch is in the **OFF** position then plug the pump into the closest electrical socket with a *grounded* (3 prong) extension cord.

6) Turn pump on, inspect for leaks, and watch closely to avoid overfilling receiving tank. When possible, empty source drum completely. Do not fill receiving tanks completely – leave 5-6 inches to allow fuel to expand and contract.

7) Once the pump is turned off, lift both hoses and drain remaining fuel in the lines into the tanks – do not let fuel drain from the hoses onto the ground.

8) Secure lids on both tanks, wipe down pump and hoses with absorbent pads, and return pump to maintenance shed. Empty drums are placed on their sides and stored on the level pad next to tank farm.

SAFETY NOTE:

- Avoid contact with all fuels – **ALWAYS** wear gloves, eye protection, and appropriate clothing.
- Full fuel drums are heavy and awkward – before attempting to move, clear a path and work on level ground. If full drums cannot be moved safely, transfer half the fuel into an empty drum and make two trips to lighten the load.

ELECTRICAL SYSTEM

GENERATORS

The Chignik Weir facility uses three Northern Lights - Lugger generators to supply electrical power. All generators and associated maintenance supplies are located in the generator shed at the southwest end of the bulkhead (building # 8 – Figure 3). Facility power is provided 24 hours per day by alternating between the two main generators located parallel to each other inside the second bay door of the generator shed. The third generator (located perpendicular to the main generators) provides 220 volt power for welding and the SCUBA tank compressor as needed. All generators use #2 diesel fuel provided directly from the two large diesel tanks adjacent to the generator shed.

NOTE: The generators produce large amounts of heat during normal operation. To prevent overheating, ensure the vent fan (east wall of generator shed) is running and the main bay door is open one to two feet at all times.

GENERATOR OPERATION

Starting Procedure

Prior to starting any generator, ensure there is sufficient oil (dip stick on top on generator) and antifreeze (open *cold* radiator cap).

To start generator(s) use the following procedures:

1) Switch the main breaker (on back wall behind each generator) of the generator to be started to the OFF position.

2) Turn starter switch (black knob located on back panel of generator) once to the right and wait until the glow plug is visible through the small port hole below the starter switch.

3) Once the glow plug is visible, start the generator and run for approximately five minutes before transferring electrical load.

Transferring Electrical Loads

Only one generator can be online and supplying power to the weir facility at one time. Thus, facility power will be interrupted momentarily while transferring electrical load from one generator to the other. Notify facility personnel prior to transferring load to prevent computer data loss or phone interruption. Do not switch generators during the first ten minutes of each hour while escapement cameras are recording.

Three separate breaker boxes control the main generators. Each generator (#1 and #2) has an independent breaker box clearly labeled on back wall behind each generator. These breakers independently connect each generator to the facility's electrical control box. The third breaker, (electrical control box) transfers the online generator's electrical load to the facility's main electrical grid.

To transfer electrical load (i.e. switch from generator #1 to generator #2) use the following procedures:

1) Start offline (#2) generator and run for five minutes – ensure #2 independent breaker is in OFF position prior to starting.

2) After #2 warm up period, turn #1 (online generator) independent breaker to the OFF position.

3) Turn the #1 breaker on the electrical control box to OFF position, slide safety switch to the #2 breaker position and turn to the ON position.

4) Turn #2 independent breaker to the ON position.

5) Allow generator #1 to cool down for approximately 5-10 minutes before shut down.

Generator Maintenance

Changing the generator oil and cleaning the air filter is necessary every 100 hours of use. The best time to change oil is immediately after switching generators when engine oil of the offline generator is still warm. Fuel filters on generators should be changed every 200 hours of use.

Change oil/air filters (100 hours use) as follows:

1) Place bucket under the oil drain hose on the bottom left side on generator.

2) Open stopcock and drain oil completely (approximately 10 minutes) then close stopcock.

3) Remove oil filter with filter wrench, apply thin layer of oil to new filter gasket and screw new filter in place (hand tight).

4) Add new oil (Approx. 8 liters - Delo 400 from drum in shed) to oil filler cap located on top of generator.

5) Clean air filter (in housing on top of generator). Remove filter, clean with compressed air and replace.

6) Check oil level and adjust as necessary.

7) Record generator hours, date, and maintenance activities in logbook.

8) Drain used oil into waste oil drum located outside next to generator shed. When full, waste oil drum can be transported to the lake village for disposal (contact Chignik Lake Village Council Office 845-2212).

Change fuel filters (200 hours use) as follows:

1) Close fuel valve for the generator being serviced and place bucket and oil absorbing pads under fuel filter housing.

2) Remove fuel filter with filter wrench.

3) Fill new filter completely with clean #2 diesel and screw in place hand tight.

4) Open fuel valve.

5) Remove trapped air by opening the bleeder valve (bolt) located on the top of the filter housing. Allow air/fuel to drain from bleeder valve for several seconds or until no air bubbles are visible then close valve.

6) Run generator briefly to ensure there is no air in the fuel system.

7) Record generator hours, date, and maintenance activities in logbook.

The fuel filter for the main fuel line (located on back wall of generator shed) should be changed at the end of each season. To change, close main fuel line valves, remove filter, and replace with new filter (full of #2 diesel). Replace this filter before shutting down generators for the season to ensure there is no air trapped in the system.

WATER AND SEPTIC SYSTEMS

WATER SYSTEM

The facility's water system is composed of two catchment tanks, a 720-gallon cistern, water pump, pressure cylinder, and filtration system. Fresh water is supplied from a hillside stream behind the facility (primary) and the Chignik River (secondary). The primary water source consists of a catchment and settling tank accessed by footpath behind the office building. Water is collected by a perforated PVC pipe buried in the stream channel that empties into a wire-mesh covered plastic drum. From the drum, water is gravity fed to a settling tank where large particulate matter and sediment is filtered out before emptying into a large holding cistern housed behind the office building (bldg. #3 – Figure 3).

The secondary water source is collected directly from Chignik River with a submersible pump. The pump is located in a vertical steel pipe at the north end of the bulkhead near the handicap boat dock. The switch for this pump is located in the downstairs bunkhouse bathroom in the breaker box next to the washer and dryer. This system is used when the

water demand is greater than the supply from the primary system and should only be used as a backup due to the turbidity of the river water and lack of settling tanks in the system.

Water drawn from the holding tank is pressurized with a water pump and stored in a single pressure cylinder which delivers water throughout the facility. Before entering any of the buildings, water passes through a series of filters which remove sediment and a UV light purification system that eliminates biological agents and pathogens.

Maintenance and Troubleshooting

The facility's water system requires some routine maintenance to function properly. Problems with the water system typically result from insufficient water in the holding tank and to a lesser degree low water pressure due to clogged filters. The primary water source (hillside stream) normally supplies enough water for the facility throughout the field season. Thus, insufficient water in the holding tank typically results from clogged filters in the catchment drum and/or settling tank. Checking and cleaning the stainless steel mesh filter in the settling tank (white tote) once per week is necessary to maintain the water supply.

Low water pressure typically results from clogged filters in the filtration system. Procedures for maintaining and replacing filters are outlined in the *Winterizing Water System* section below.

NOTE: The water pump normally runs no more than 10-15 seconds approximately every hour depending on demand. If the main water tank is empty, the water pump will run continuously resulting in permanent damage. If the water pump is running continuously, immediately turn off pump at the breaker box located next to the UV filter behind the office building. Check the catchment system (clean filters if necessary) and turn the breaker back on only when there is sufficient water in the holding tank.

Winterizing Water System

The entire Chignik weir facility water system must be completely winterize at the end of each season to prevent damage from freezing. Following is the list of procedures necessary to winterize the water system:

1) Turn off breaker for the water pump (next to UV filter on back wall of office building).

2) Remove and clean uppermost hillside catchment drum from under supply pipe.

3) Remove drain plug from lower settling tank (white fish tote), flush out sediment and scrub thoroughly (fill several clean 5-gal buckets before draining to flush). Remove and clean sock filter (if present), and clean stainless steel filter. Replace drain plug and tote cover.

4) Drain main holding tank drain completely by opening valve located under the outside wall (corner adjacent to greenhouse) of the pump shed.

5) Clean and flush sediment out of bottom of main tank using the fire pump or secondary water system. Close drain valve.

6) Drain pressure tank and water pump by opening valve on black waterline that runs outside from the water pump to the filtration system at the "T" union (drains into culvert). Leave valve open until entire winterization process complete. Close only after steps outlined below are completed.

7) Remove drain plug on water pump to drain any remaining water in pump. Fill with antifreeze or cooking oil, replace plug.

8) Open drain valve on bottom of blue filter unit. Close valve when finished

9) Unscrew top of blue filter unit and remove sock filter. Clean, dry, and replace.

10) Unbolt top of stainless Harmsco filter unit. Remove paper filter cartridges, clean inside of cylinder, and add new filters (7 total). Replace lid when finished.

11) Open both valves (one on either side) on UV filter and drain. Close valves.

12) Drain, remove, and replace Omnifilter next to hot water tank behind office building by unscrewing the bottom of filter from the filter housing and inserting new filter.

13) Drain office building plumbing (**3 valves**)

a. Open all faucets inside apartments/laundry room.

b. Open valve (**1**) on bathroom ceiling in Assistant Manager's apartment, drain into bucket, and close.

c. Open valves (**2**) in crawl space under office building, drain, and close. Both valves located near crawl space door at the rear of the building (orange flagging attached).

d. Turn off water (hot and cold) to washing machine – briefly turn on washer to drain remaining water in lines.

e. Add approx. 1/4 gallon RV antifreeze to all sinks, toilets (including tanks), shower drains, and wash machine. Flush toilet after adding antifreeze and add more antifreeze once flushed.

f. Drain hot water heater.

g. Unhook and store outside garden hoses (2).

14) Drain pilot house plumbing (**1 valve - next to hot water heater in wood shed**).

a. Open faucets before draining.

b. Add RV antifreeze to sinks, toilets, and shower drains. Flush toilet after adding antifreeze and add more antifreeze once flushed.

c. Drain hot water heater

15) Drain bunkhouse plumbing. (**3 valves**)

Valve Locations: 1) Outside back corner next to generator shed; 2) Above sink in limnology lab; and 3) Downstairs bathroom ceiling.

a. Open bunkhouse faucets before draining.

b. Turn off water (hot and cold) to washing machine – briefly turn on washer to drain remaining water in lines.

c. Remove, drain, and replace Omnifilter above pressure tank (inoperative) in downstairs bathroom.

d. Add RV antifreeze to sinks, toilets, shower drains, and washing machine. Flush toilet after adding antifreeze and add more antifreeze once flushed.

e. Drain hot water heater.

f. Unhook and store outside garden hose.

Season Startup

If the water system was properly winterized the previous season, bringing the system online will require the following steps:

1) Ensure all building drain valves are closed. (7 total)

2) Replace/reconnect uppermost cistern under source pipe.

3) Allow holding tank to fill.

4) Close all faucets in all buildings.

5) Install new UV light in UV filtration unit. See owner's manual (office file cabinet) for specific instructions. Spare UV lights located in office laundry room.

6) Turn on water pump.

7) If closed, open all building valves slowly. After the pump has pressurized the system it is important to open the valves slowly so as not to rupture pipes and fittings.

8) Quickly check for leaks throughout the facility.

9) Open toilet and washing machine lines.

10) Allow faucets/showers/toilets to run in each building for several minutes to flush system with fresh- filtered water.

11) Recheck entire system for leaks.

**If temperatures are still at or below freezing, leave a faucet continually running (slowly) in each building to prevent lines from freezing.

Reference - Filter Types

Sock filters: Blue filter cylinder below UV unit – FSI sock filter (part # 41601B). These filters can be cleaned and reused many times before needing replacement.

Paper filters: Stainless cylinder below UV unit – Harmsco Upflow Cartridge Filter - Model HIF 801-1 paper filters. Garness Industrial Inc. Anchorage (800) 478-2933

Yarn filters: 1 outside next to office building hot water heater and 1 inside downstairs bunkhouse bathroom – FILTERRITE (C10P-W5 C). Garness Industrial Inc.

UV Filter: Ideal Horizons UV Biological Filter – Model LCI-2L

All filters are stored in the scale room above the maintenance shop with the other plumbing supplies. All filters can also be purchased from bigbrandfilters.com (818-340-7258).

SEPTIC SYSTEM

All waste water generated at the Chignik Weir facility is treated using two separate septic systems. System #1 services the office building and pilot house and is located underground in front of the maintenance shop. Cleanout access is a capped PVC pipe (spray painted orange) approximately 15 feet from maintenance shop stairs. System #2 services the bunkhouse and is located underground in front of the generator building. Cleanouts are capped PVC pipes (spray painted orange) in front of the first bay door of the generator shed.

NOTE: Identify the locations of the cleanouts and use caution when moving equipment in these areas to avoid damaging or destroying.

Septic Maintenance

Functioning septic systems typically do not require direct maintenance. However, septic systems are different than conventional sewer systems and require some preventative maintenance. Household water use directly controls how quickly waste travels through a septic system. Wastewater that enters the tanks requires time to allow the solids to settle to the bottom. The higher the volume of water that is introduced to the system, the less opportunity the wastewater has to settle in the holding tank and the less opportunity the bacteria have to break down the solids. Thus, avoid using excess water and be aware of ‘peak’ water times (i.e. avoid using wash machines during mornings/evenings).

To function properly only solid waste, toilet paper, and normal amounts of common household chemicals should be added to septic systems.

The following items should **NOT** be added to septic systems:

- Cooking oil/fat/grease
- Solid foods
- Matchsticks
- Paper towels, plastic, wax, or any other synthetic materials
- Feminine hygiene products
- Toxic or hazardous chemicals

Additionally, septic enzymes (located in maintenance shop) should be added to both septic tanks at the beginning and end of each season. Follow manufacturer’s instructions for adding enzymes.

WATERCRAFT

The Chignik Weir facility uses a variety of skiffs for weir installation and removal, transportation, and field sampling. Following is the current inventory of Chignik watercraft and their uses:

- 18 ft Lund w/ 4-stroke 40 jet – general use
- 16 ft Lund w/ 4-stroke 25 prop – general use
- 18 ft Lund w/ 2 stroke 70 jet – manager(s) use
- 18 ft custom aluminum (skillet) w/ 4-stroke 65 jet – weir work and general use
- 18 ft Lund w/ 4-stroke 40 prop – smolt/research
- 18 ft Lund w/ TBA – pilot
- 18 ft custom aluminum (smolt skiff) w/ 2-stroke 90 jet – smolt/research
- 21 ft custom aluminum (tin skiff) w/ 4-stroke 115 prop – fuel/gear transport
- 40 ft custom aluminum (scow) w/ 2-stroke 50 prop – weir work/cargo/garbage

OPERATION AND MAINTENANCE

The weir facility uses a combination of 2-stroke and 4-stroke outboard engines with both propeller and jet drives. These 4 types of outboards function differently and require separate operation and maintenance needs.

Engine Oil (2-stroke vs 4-stroke)

2-stroke engines do not have a dedicated engine oil lubrication system similar to those found in conventional automobiles. Thus, 2-stroke type oil must be mixed with gasoline to lubricate the engine while gas is consumed (most small outboards require a 100:1 gas/oil mix (5 ounces oil for 1 gallon gas)).

There are two methods for adding 2-stroke oil to the weir facility's 2-stroke outboard motors: **1)** directly adding the correct ratio of 2-stroke oil to the gas tank (15 hp Yamaha) and **2)** adding straight 2-stroke oil to the oil mixing reservoir on the engine compartment (40/50/70 hp Yamahas). Failure to add 2-stoke oil by either method will quickly destroy any 2-stoke engine. Because oil is constantly consumed with gasoline, oil **must** be checked before and after each use.

In contrast, 4-stroke engines have dedicated oil lubrication systems. 4-stroke engine oil is not consumed during normal operation but engine oil must be regularly checked by removing the cowling and checking the oil level on the dipstick. Under normal conditions, 4-stroke engine oil typically needs to be changed only once every season. Refer to the owner's manuals in the office for detailed information on each outboard.

NOTE: 2-stoke and 4-stroke oils are **not** interchangeable. Use the appropriate oil type at all times.

Drive Systems (Propellers vs Jet Drives)

Outboards with propellers are more efficient than jet drives and are used for towing, boating long distances, or in rough water conditions. In shallow water, extra caution must be used with propellers - reduce RPM's to a minimum and tilt the outboard up to prevent striking bottom. Before operating propeller driven skiffs, become familiar with the steering and tilt mechanisms specific to each outboard and ensure a spare prop and the proper tools are onboard.

Before and after each use, check props for nicks, rolled tips, or bent blades. Damaged propellers will cause a loss in performance and can create vibrations harmful to the engine. Props with worn blades might also allow the engine to accelerate beyond the recommended operating range resulting in permanent damage to the engine. When a propeller is damaged while operating, stop and assess the damage before continuing. If the prop is severely damaged, slowly proceed to the nearest level shoreline and replace.

To change propellers use the following procedures:

1) Remove cotter pin holding castle nut in place.

2) Remove castle nut with wrench by turning counter-clockwise while holding the propeller in place.

3) Carefully note order, and remove bushing(s) between castle nut and propeller.

4) Slide propeller off drive shaft.

5) Slide replacement propeller on by aligning groves inside propeller with those on the drive shaft.

6) Replace bushings in same order and arrangement they were removed.

7) Tighten castle nut such that the cotter pin hole in the drive shaft is visible between the 'castle' grooves such that a cotter pin can be inserted to prevent the nut from spinning loose. Do not over-tighten the castle nut.

8) Insert new cotter pin and bend the ends outward to secure it in place.

Jet drives work by forcing water through a tapered sleeve (housing) using an internal impeller. The result is a water jet that propels the skiff forward. To work efficiently, there must be a close fit between the impeller and sleeve. Thus, pulling sand, gravel, wood, weeds, or other foreign objects into the jet drive can damage both the impeller and sleeve resulting in permanent damage or loss in performance.

When foreign objects (i.e. eel grass in Chignik Lagoon) are pulled into the jet unit (indicated by loss of power or change in rpm's), stop immediately and turn engine off. Lift outboard and remove all objects from the 'foot grate' on the bottom of the jet unit. A screw driver or pocket knife may be needed to remove objects lodged in the grate. In some instances the foot will need to be removed to clear objects that have passed through the grate. To remove the foot, slowly proceed to the nearest shoreline and carefully unbolt the foot from the lower unit, clean thoroughly, and replace ensuring the pointed end of the foot is oriented forward (towards bow).

Cooling System

All facility outboards are water cooled. Cold water is pulled into the outboard below the waterline and circulated throughout the engine before it's discharged with the exhaust. Thus, there are no antifreeze levels to check or radiators to maintain. However, all outboards have a small valve above the waterline on the back of cowling that discharges a small stream of water at all times while running. This discharge or 'pee' valve is an indication that the cooling system is working properly. It is important to ensure the discharge valve is working properly before and after each use or immediately after hitting bottom. Running outboards while water is not being ejected from this valve may result in damage to the engine.

Occasionally weeds or other objects get sucked into the water system that can damage the water pump or clog the small hose that leads to the discharge valve. If the outboard is overheating (loss of power, surging RPM's, knocking, and/or getting louder), turn off immediately. Raise the lower unit to ensure the water intake ports (located on both sides of lower unit just above the prop/jet) are free from weeds. If the intakes are unobstructed and no water is emitted from the discharge valve after restarting, turn off and check to ensure the valve itself is unobstructed by feeding a short flexible length wire into the valve outlet on the back of the outboard. If the outboard continues to overheat (or suspect cooling system failure) tow the skiff to the weir facility and consult the owner's manual for troubleshooting cooling system components. Several facility outboards (tin / limnology / skillet) also have audible overheating alarms in addition to discharge valves.

WINTERIZING OUTBOARDS AND SKIFFS

All skiffs and outboards are removed from the water, winterized, and stored for the winter. Following are the general guidelines for winterizing outboards and skiffs:

Outboards

1) Disconnect spark plug wires, remove, inspect, and clean/replace sparkplugs.

2) Spray fogging oil into each cylinder (1-2 seconds) and replace spark plugs.

3) Turn over engine several times to distribute fogging oil within each cylinder.

4) Rinse exterior with freshwater and clean residue from all surfaces. Remove corrosion and lubricate electrical connections.

5) Remove outboard from skiff and hang upright in outboard shop.

6) Change lower unit lubricant by removing the lower drain plug and upper vent plug. Once all lubricant has drained, inject new lubricant into lower drain plug until lube begins to drain out of vent hole. Quickly replace both plugs.

7) Inspect props and jet impellers – service or replace as necessary.

8) Change crankcase oil in 4-stroke engines. Refer to owner's manual for specific procedures and oil types (located in office file cabinet). Fill oil reservoirs in 2-stroke models.

9) Lubricate all service points, including grease zerks, shift/throttle linkages, and steering cables. Refer to owner's manual for specific lubrication points.

10) Date and record maintenance activities on a label and attach directly to each outboard (include which skiff the outboard came from).

Skiffs

1) Remove, clean, and label all gas tanks/lines, anchors, toolboxes, oars, bilge pumps, and floatation devices. Store in outboard shop. Use wire brush to remove any rust on tools then lubricate with anti-corrosion spray before storing for winter.

2) Remove batteries, clean, label, and fully charge for storage.

3) Drain, inspect, and replace fuel filters as necessary.

4) Scrub hull and floorboards with bleach and water solution.

5) Clean and lubricate steering and throttle parts to prevent corrosion. Label all cables and hoses that are removed and make a detailed description of where they are reattached for the following season.

6) Remove drain plugs and attach to the hull.

7) Secure all skiffs on the bulkhead with sturdy rope to prevent them from floating or blowing away during winter.

NOTE: The majority of boat (and rechargeable tool) batteries are palletized and transported to the Norquest/Trident Seafoods processing plant in Chignik Bay for warm storage during winter. Contact Norquest (907-749-2276 or Robert Carpenter - VHF channel 6) for arrangements.

MOORING

The height of Chignik River is influenced by tides, current, runoff, and wind. Given this large variation, caution must be used when mooring all skiffs to the bulkhead. Facility skiffs are typically moored at 3 locations: pile driver, floating dock upstream from weir, and the handicap dock. Avoid mooring skiffs on the bulkhead between the weir and pile driver for extended periods of time so boat gate traffic can pass freely.

When securing skiffs directly to any fixed surface (i.e. cleats on bulkhead or handicap dock), leave enough slack in the line (5-6 ft) such that the skiffs can rise and fall freely with the tides. Skiffs moored to the pile driver or the floating dock upstream from the weir typically do not need additional slack in the line because the pile driver and dock themselves with move with the tides. However, during high tides (9+ ft) extra caution must be used to prevent skiffs from floating onto the bulkhead behind the pile driver or handicap dock. Several times in the past skiffs have sunk because they partially floated onto the bulkhead and tipped over as the tide dropped.

SAFETY AND NAVIGATION

Prior to departure, all skiff users (and hikers) must file a float plan located on the back of the office door. All users (drivers and passengers) are also required to wear state approved personal flotation devices (PFD's) at all times while on the water and have

adequate fuel, oil, tools, spare prop/impeller, flares, and a handheld VHF radio in the skiff. It is each user's individual responsibility to refuel, clean, and maintain skiffs before and after operation.

There are numerous navigational hazards in waters surrounding the weir facility. River channels, water depth, tides, rocks, and weeds vary greatly in Chignik River and Chignik Lagoon. When boating in unfamiliar waters, first have an experienced operator demonstrate the appropriate route. When in doubt proceed SLOWLY. Additionally, consult the appropriate navigational chart to determine the safest route. Both paper and electronic charts are readily available in the office.

COMMUNICATION SYSTEMS

The Chignik weir facility has three primary forms of communication (telephone, radio, and internet) for official and personal use.

TELEPHONE

The current telephone system has three separate lines:

1) Fax line (907-845-2235)

2) Auxiliary telephone or 'BAT' line (907-845-2216)

3) Office business line (907-845-2243)

All three lines are transmitted using Ritron Transceivers located on the communications tower located on the hill above the facility (#10; Figure 3). Telephone signals are transmitted from the weir communications tower to a sister tower located in Chignik Lake Village (located on Donny Lind's house 845-2203) where they are connected to the regional telephone network provider (GCI). At present, none of the three telephone lines are secure - meaning they transmit on the same frequency as common VHF and/or Single Side Band radios. Thus, facility phone conversations can be, and are, regularly monitored by the public. Given this lack of privacy, discretion must be used when communicating official business, personal information (SSN#, credit card information etc.), or anything of local/regional concern.

The BAT phone can be used for personal use after normal work hours with a few exceptions: 1) emergencies, 2) when the ADF&G pilot has an open flight plan, and 3) line needs to be used for official business. All personal long distance calls must be made with toll free calling cards paid for by the user.

Season Startup and Shut Down

Currently, all three phone lines have separate signal transmitters (black boxes). While operational, the transmitters are located in an enclosed electronics box at the base of the communication tower above the weir facility. During winter the transmitters are removed and stored in the office. Each transmitter is labeled (1, 2, and 3) corresponding to the line they service. To setup the phone system use the following procedure:

1) Move transmitters from office to electronics box at base of tower.

2) Connect labeled wires (3 each - 9 total) inside electronics box to corresponding transmitters.

3) Plug in telephone router in office (provides power to communication tower).

4) Contact Donny Lind (845-2203) and make arrangements to plug in and connect the sister telephone router at village.

RADIO

The facility has two forms of radio equipment: Single Side Band (SSB) and Very High Frequency (VHF) radios. In general, SSB radios are used to communicate with persons outside the range covered by VHF radios. The Chignik weir facility uses SSB frequency 3.230 MHz to give daily (0800) weather and fishery updates to the ADF&G Kodiak office and relay pertinent information to the area fishing fleet.

SSB frequencies are regulated by the Federal Communications Commission (FCC) and require a call sign and license to operate. The call sign for the Chignik Weir is WON 29. When using the SSB, first state the call sign of the party to be contacted (e.g. WON 32 Kodiak) followed by the weir's call sign. After contact, keep conversations short and concise and end by restating the Chignik weir call sign. A complete list of regional ADF&G offices and camps as well as additional transmitting frequencies is located on the wall behind the SSB radio in the office.

The VHF radio is used to give daily (0915 and 1815) fishery updates, track ADF&G aircraft, and communicate with the fishing fleet and weir personnel while in the field. Use VHF channel **6** for general contacts in the greater Chignik area. Similar to SSB, first state the party to be contacted followed by the facility's VHF call sign (Chignik Weir or Fish and Game). For extend conversations switch to a different channel. Both VHF and SSB are publicly broadcasted frequencies; always assume someone else is listening to your conversations.

Outside of connecting/disconnecting cables and power supplies, the radios require no additional seasonal startup or shutdown procedures.

INTERNET

The facility uses a dedicated Starband satellite connection for email and internet access. The satellite dish is located on the front of the pilot house. Given the weather and remote location of facility, internet access is often unreliable. During periods of heavy rain and cloud cover internet access is intermittent, carefully wiping excess water from the dish and receiver sometimes improves the signal.

The satellite dish is removed and stored indoors (dive shop) during winter. To setup the internet connection use the following procedure:

1) Carefully, bolt the dish to the pilot house in the exact previous location using the pre-existing holes and hardware.

2) Connect the attached coaxial cable.

3) Connect office end of the coaxial cable to the internet router box (on shelf above coffee pot in office).

4) Plug in router to power supply and turn switch located on back of box to the ON position.

Personal use of the internet is available first-come first-serve while off duty provided it does not interfere with any official business. Proper internet use (personal) is outlined in the State of Alaska Office Policy on Personal Use of Office Technologies found in the pre-season hiring paperwork and in Appendix A1 of this document.

EMERGENCY PLANS

EMERGENCY CONTACTS

- Chignik Lake Medical Clinic: 845-2236
- U.S. Coast Guard Search and Rescue: 800-478-5555
- U.S. Coast Guard Search and Rescue SSB: 4.125 MHz
- Providence Kodiak Island Medical Center: 907-486-3281
- Alaska State Troopers (Kodiak): 907-486-4121
- Alaska Department of Fish and Game – Kodiak : 907-486-1825
- Alaska Oil/Hazardous Spill Hotline: 800-478-9300
- Wildlife Enforcement: 907-486-4761
- PenAir: 800-448-4226
- Willard Lind (winter caretaker): 907-845-2234

FIRE SUPPRESSION

The Chignik weir facility is self sufficient in the event of fire. The facility is built on an abandoned coal mine making fire prevention and suppression critical. The weir uses two types fire fighting equipment: ABC dry chemical fire extinguishers located in every building and work area, and two portable Honda fire pumps. The primary water pump is located on the bulkhead in front of the outboard shop and is ready for immediate use. The secondary pump is stored in the wood storage area under the pilot house.

In the event of a fire, first notify all weir personnel and assess the situation. If the fire is small and confined, use fire extinguishers to suppress flames. For larger fires notify the Chignik Lake Medical Clinic and use the fire pumps. If the situation is unsafe (fire at or near fuel supplies) abandon the immediate area.

Following are the procedures for starting the fire pumps:

1) Ensure water intake hose is submerged in the river and the intake strainer is clear of weeds and debris.

2) **Unroll** fire hose and ensure the nozzle is attached and turned to the OFF position.

3) Prime the pump by pouring water from the labeled water jug next to the pump into the labeled priming water filler cap located on top of the pump.

4) Move fuel valve lever to the ON position

5) Move the choke lever to the OFF position

6) Move throttle lever away from the SLOW position about 1/3 of the way towards the FAST position.

7) Turn ignition switch to the ON position.

8) Pull recoil cord until engine starts.

9) After started, move choke lever slowly to the OPEN position.

10) Move throttle lever to FAST position to increase pump output.

PERSONAL INJURY

Personal injury poses the greatest risk to facility personnel. In the event of major medical emergencies access to adequate care is limited due to the remote location of the facility. For minor injuries, first aid kits are located in the bunkhouse, office, and maintenance shop. For emergencies or injuries that require professional medical attention contact the Chignik Lake Medical Clinic (845-2236 or VHF channel 6).

SPILL RESPONSE

The weir facility's oil/fuel spill response kit consists of portable oil absorbent booms and pads. The booms are stored in 55 gallon drums located between the generator shed and tank farm. Absorbent pads are located in the supply room inside the generator shed. In the event of an oil/fuel spill, assess the situation and identify any risk of fire or explosion. If safe, isolate and close leak source if possible. Deploy oil booms surrounding the spill area whether on ground or in the water. Use the pads to collect remaining fuel. For large spills, immediately contact the area manager and Kodiak Fish and Game office or the Oil Spill Hotline after hours.

CREW GUIDELINES

WORK SCHEDULES

Unlike many remote ADF&G field camps, the Chignik weir support staff uses regularly scheduled hours and work shifts (Appendix B1). The typical work week consists of five 7.5 hour days, one 5.5 hour day, and one day off. Scheduled work shifts (morning, day, and night) typically rotate each pay period among the crew with the exception of the senior maintenance crewmember (FWT III) who has a fixed day shift. Each crewmember is also responsible for opening and closing the boat gate after hours approximately once every week.

Work schedules and duties are assigned by the assistant manager with guidance from the senior maintenance crewmember. Weekly, a prioritized task list is posted to serve as a work guide. However, priorities routinely change and situations arise that require immediate attention. In these instances the assistant manager will reassign individual work priorities. In the absence of the assistant manager, the senior maintenance crewmember or area manager have this responsibility.

Extended leave is typically not given during the field season. However, leave for emergency situations can be accommodated.

In general, complete tasks in their order of importance without accruing excessive overtime. Most projects can be finished within normal working hours. However, there

will be occasions when the normal work schedules are insufficient to complete the necessary tasks. In these instances the assistant manager (or area manager) will authorize additional hours except during emergency situations that jeopardize property or personnel.

TIMESHEETS

Weir staff are responsible for tracking their own work hours and submitting timesheets. Timesheets are due the 15th and last day of every month. Timesheet templates are located on the staff computer in the office. Crewmembers are highly encouraged to create separate folders on the staff computer to record hours and save timesheets.

Following are the procedures for completing timesheets: (see Appendix C1 for example)

1) Open timesheet template (excel spreadsheet) – when prompted to select new pay period make sure the pay period dates are correct and click OK.

2) Fill in pay period ending date, name, SSN#, and Commercial Fisheries next to *Division* on the top lines of the timesheet.

3) Enter actual hours worked. Enter all times in the 24-hour format separated by a colon (e.g. 08:00 / 12:00 / 13:00 / 16:30).

4) On days with boat gate responsibility, enter 7.50 hours in the standby column for the day of and day after boat gate duty.

5) In the *comments box*: enter 'Boatgate Standby' for the dates with recorded standby hours.

6) In the *Charge To* box: enter 'Chignik General' under *Notation*, and '11100041-11140730' under *CC/LC*.

7) Check for errors then 'Save As' your name+timesheet+date (i.e. John Doe Timesheet 7-15-06.xls).

8) Email electronic copy of completed timesheet to assistant manager.

9) Print hard copy, sign, date, and place in assistant manager's inbox.

COMPUTERS

Computers are first and foremost for official business. However, weir staff may use the facility's computers to access email and the internet while off duty. The manager, assistant manager, and pilot computers are not available for public use unless specifically stated otherwise. The staff computer is available first-come first-serve for personal use provided it does not interfere with any official business. Personal computers (i.e. laptop computers) cannot be connected to the weir facility's internet network.

PURCHASING

Facility staff will need to purchase additional food, fuel, and supplies throughout the field season. Purchases must first be approved by either the manager or assistant manager. Receipts from ALL purchases must be obtained and given to the assistant manager immediately after purchase (have receipts from phone or internet orders emailed or faxed

to the weir office). Managing and replacing supplies is the responsibility of all weir staff. Be proactive, identify shortages, and predict future needs before it's too late.

VISITORS / PUBLIC INTERACTION

Local residents and visitors regularly stop at the weir to obtain permits, ask questions, express concerns, or to simply look at the weir and cameras. Weir staff are ultimately responsible for the safety of all visitors at the facility. Within reason, visitors should be limited to the bulkhead and office. Above all, be patient, courteous, and helpful. Success at the weir depends on public support, always remember to be a good neighbor, show respect, and offer assistance when necessary.

FIGURES

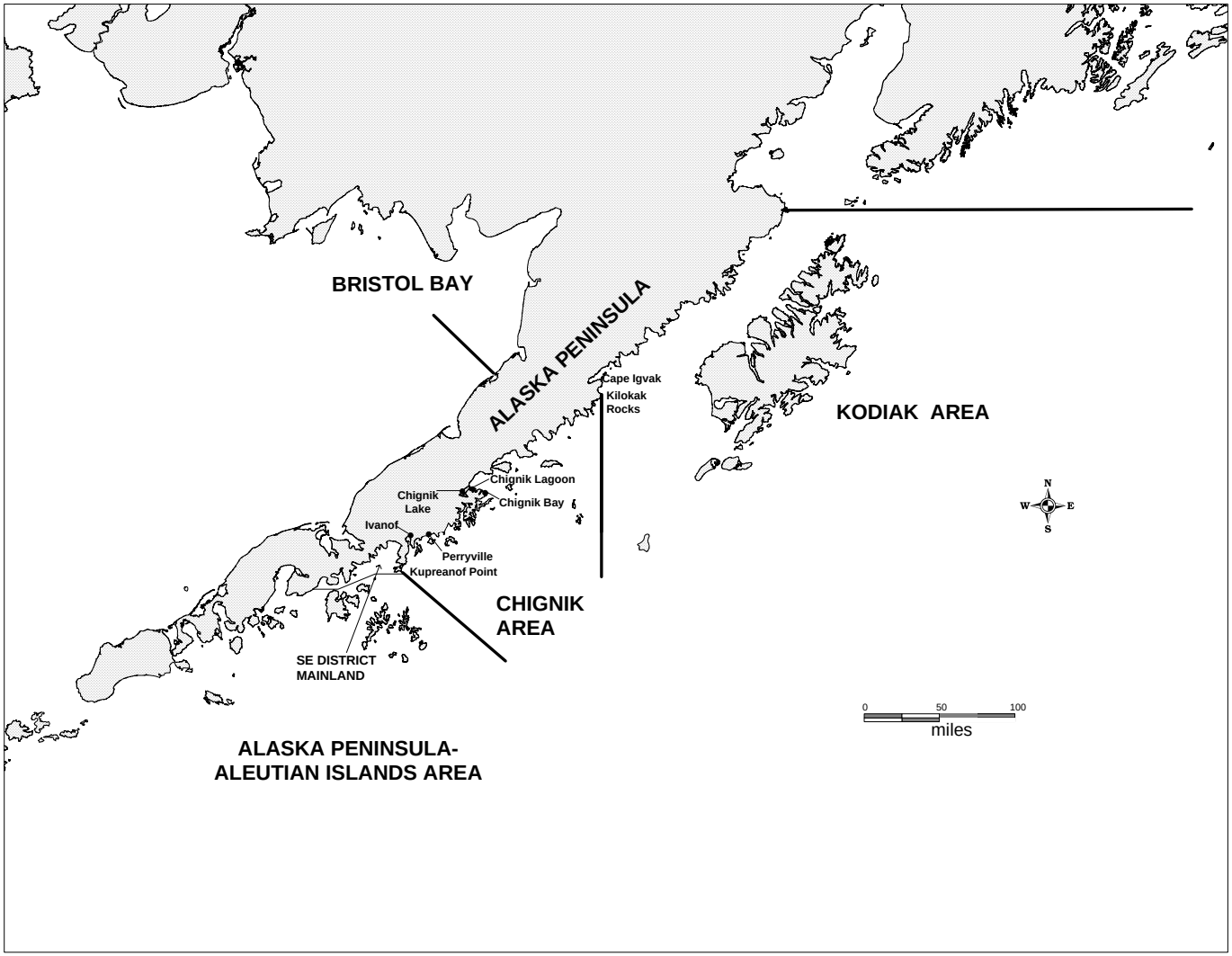

Figure 1.-Map of the Alaska Peninsula illustrating the relative locations of the Chignik, Kodiak, and Alaska Peninsula Management Areas.

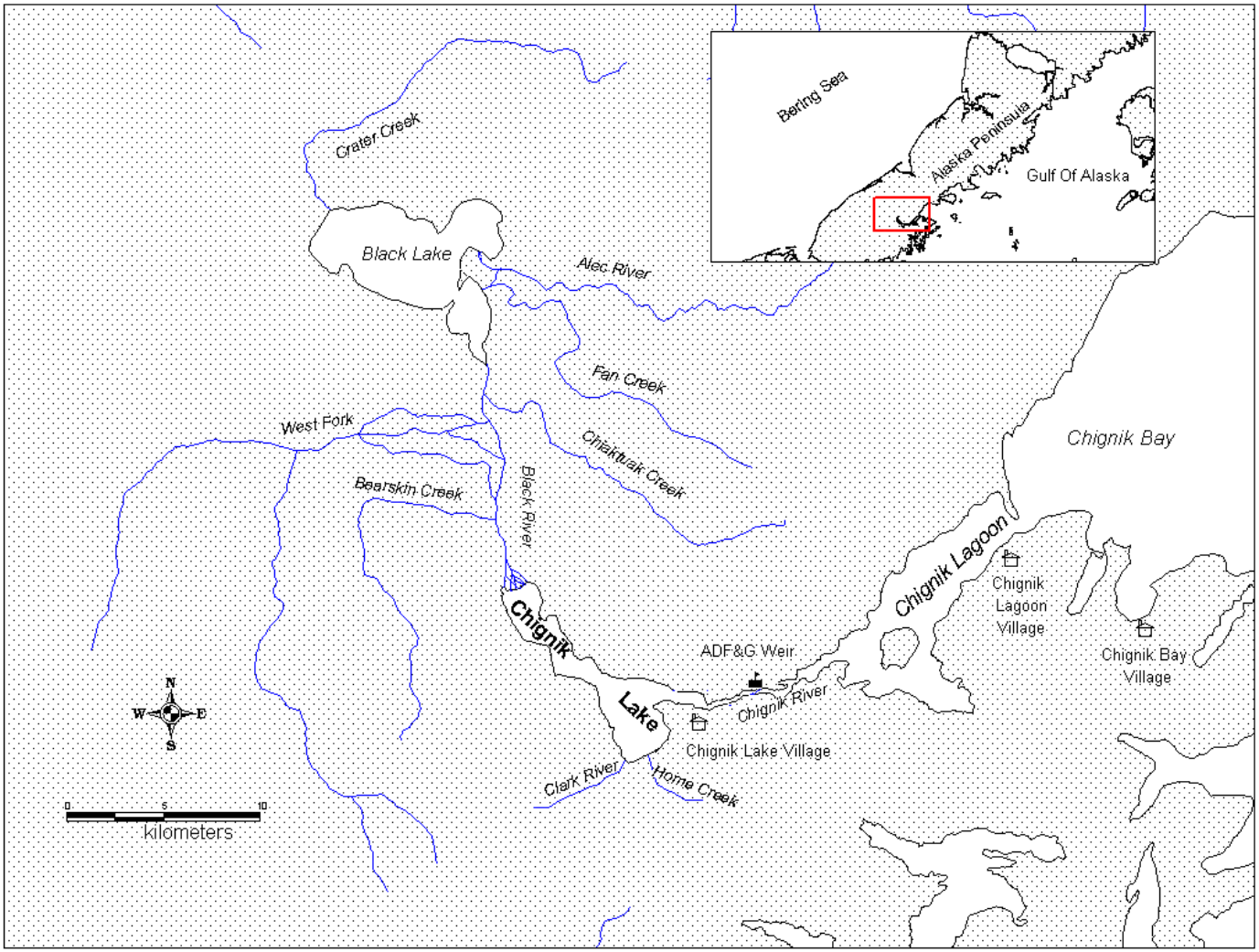

Figure 2.-Map of Chignik River system illustrating location of the Chignik weir facility.

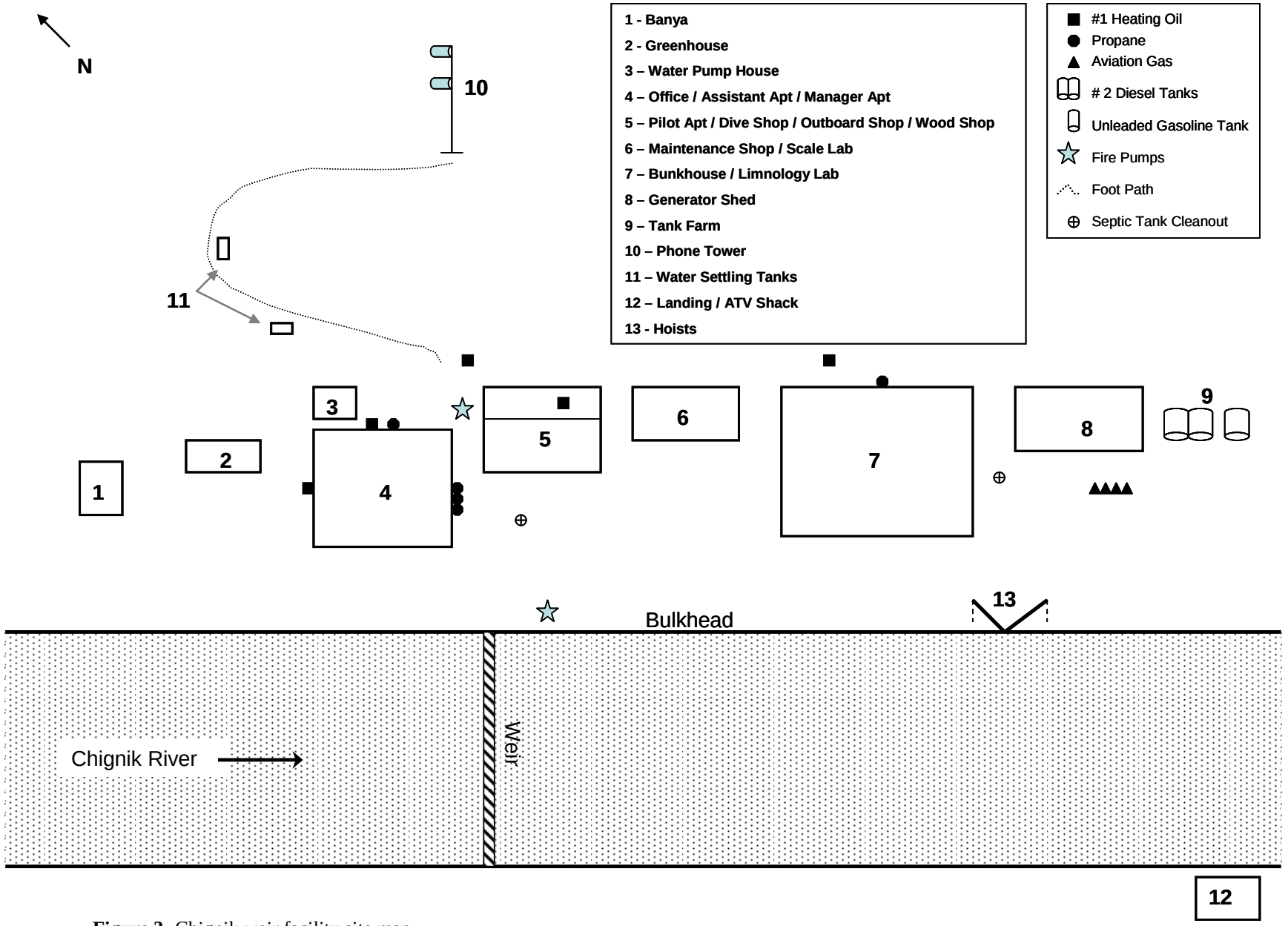

Figure 3.-Chignik weir facility site map.

APPENDIX A. PERSONAL USE OF OFFICE TECHNOLOGIES

Appendix A1.-State of Alaska policy on personal use of office technologies.

State Policy Regarding Personal Use of State Office Technologies

It is in the best interests of the state to encourage Alaska's state employees to learn to use the new office technologies that are fundamental to their future success as state employees. Use of technology that meets the ethical standards and provides exposure, education or experience is allowable and encouraged under this policy.

The office environment has a wide variety of technologies such as: digital telephone services (voice mail, message broadcasting, message and call forwarding), fax servers, image scanning and copying (color, reduction, enlargement, binding, collating), shared and stand-alone computers (fixed, portable), pagers (text and voice), cellular phones, data networks (local, regional, global), dial-up network facilities, Global Positioning Systems(fixed, portable), VHF and CB radios (fixed, portable), and wireless dispatched office pick-up/delivery courier services.

Use of Office Technologies is no different from use of any other state provided item in the workplace. Executive Branch public employees of the State of Alaska must conform to applicable Alaska statutes, Orders and Codes. Recognizing the very different agency missions or division specific needs, agencies may adopt more stringent, specific, or detailed guidelines. Reasonable use and common sense must prevail in the workplace use of Office Technologies. All policies must contain:

Prohibited uses of office technologies (not necessarily limited to the following):

1. Use for any purposes which violate a United States or State of Alaska law or the Alaska Administrative Code.

2. Use for any commercial activities, including commercial advertising, unless specific to the charter, mission, or duties of the government agency.

3. Use for access to or distribution of indecent or obscene material or child pornography.

4. Harassing other users, computing systems and/or damaging or altering the software components of same.

5. Use for fund raising, political campaign activities, or public relations activities not specifically related to state government activities.

6. Any activity which adversely affects the availability, confidentiality or integrity of any office technology.

The Executive Branch Ethics Act states a public employee may not "use state time, property, equipment, or other facilities to benefit personal or financial interests" (AS 39.52.120(b)(3)). Further, "standards of ethical conduct for members of the executive branch need to distinguish between those minor and inconsequential conflicts and those conflicts of interests that are substantial and material." (AS 39.52.110 (a)(3)).

Applicable Statutes, Administrative Orders and Codes that you may refer to include, but are not limited to: AS 39.52, Alaska Executive Branch Ethics Act; Administrative Order #81, Nondiscrimination and Non Harassment; Administrative Code 9 AAC 52, Alaska Executive Branch Code of Ethics; AS 39.25.160, Alaska Little Hatch Act; AS 24.60, Legislature Standards of Conduct.

-continued-

The State of Alaska reserves the right to routinely monitor Internet and E-mail use by individuals and report such use to appropriate supervisors. Contents of State Employees' computers are also subject to "Public Records" requests. This policy is to be read and signed by all employees in the presence of their supervisor or agency human resources staff and filed in each employee's personnel file. The signature of the employee constitutes acknowledgement of their obligation to abide by the policy. Use of the Internet and other office technology is a revocable privilege. User accounts and password access may be withdrawn if a user violates this policy. Violations may also result in possible personnel action up to and including termination and depending on the severity may result in criminal prosecution and/or civil liability. After reading and signing this policy, state employees have 48 hours after the date signed to clear any material that does not conform with this policy from any office technology.

_____
Signature of Employee

_____
Printed Name of Employee

_____
Department

_____ _____
PCN Date

_____
Signature of Supervisor

_____
Printed Name of Supervisor

_____
Department

_____ _____
PCN Date

State of Alaska
Office Technology Policy
http://www.state.ak.us/local/akpages/ADMIN/info/policy/offpol.pdf
Revised June 8, 2006

APPENDIX B. WORK SCHEDULE

Appendix B1.-Chignik crewmember work schedule.

	Sunday	Monday	Tuesday	Wesnesday	Thursday	Friday	Saturday
Early	0600-1000 1100-1430 **(7.5)**	0600-1000 1100-1430 **(7.5)**	0600-1000 1100-1430 **(7.5)**	0600-1000 1100-1430 **(7.5)**	0600-1000 1100-1230 **(5.5)**	**OFF**	0600-1000 1100-1430 **(7.5)**
Day	0800-1200 1300-1630 **(7.5)**	0800-1200 1300-1630 **(7.5)**	0800-1200 1300-1630 **(7.5)**	0800-1200 1300-1430 **(5.5)**	**OFF**	0800-1200 1300-1630 **(7.5)**	0800-1200 1300-1630 **(7.5)**
Late	1300-1700 1800-2130 **(7.5)**	1300-1700 1800-2130 **(7.5)**	1300-1700 1800-1930 **(5.5)**	**OFF**	1300-1700 1800-2130 **(7.5)**	1300-1700 1800-2130 **(7.5)**	1300-1700 1800-2130 **(7.5)**
Maintenance	0800-1200 1300-1630 **(7.5)**	0800-1200 1300-1430 **(5.5)**	**OFF**	1300-1700 1800-2130 **(7.5)**	0800-1200 1300-1630 **(7.5)**	0600-1000 1100-1430 **(7.5)**	0800-1200 1300-1630 **(7.5)**

Boat Gate	Maintenance	Smolt	Late	Day	Early	Asst Manager	Manager

Shift Specific Responsibilities

Early:
1) Review and record weir counts (2100 - 0500)
2) Complete and file weir count data sheets
3) Burn DVD archive
4) Turn off camera and boat gate lights
5) Check skiffs - bildge as necessary

Day:
1) Coordinate ASL sampling

Late:
1) Turn on camera and boat gate lights
2) Clean office - sweep/mop floors, empty trash, and clean coffee pot/sink/monitors
3) Check skiffs and facility - close doors and turn off lights

APPENDIX C. TIMESHEETS

Appendix C1.-Sample crewmember timesheet.

ALASKA DEPARTMENT OF FISH AND GAME Time and Attendance Report

Pay period ending: 10/15/2006 SSN: 123-45-6789 Name: John C. Weir Division Commercial Fisheries

Record times in military format. Example: 6:00 p.m. = 18:00. If you work past midnight, stop at 23:59 and resume at 00:01 the next day.

Day	Date	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Leave Taken		Sea Duty	Standby	Hazard	Code 1	Code 2	Code 3	Code 4	Holiday / Leave	Work Hrs Total
Sun	10/1																**0.00**				**0.00**	**0.00**
Mon	10/2	8:00	12:00	13:00	16:30												**7.50**				**0.00**	**7.50**
Tue	10/3	8:00	12:00	13:00	16:30												**7.50**				**0.00**	**7.50**
Wed	10/4	8:00	12:00	13:00	16:30	19:00	19:15								7.50		**7.75**				**0.00**	**7.75**
Thu	10/5	8:00	12:00	13:00	16:30										7.50		**7.50**				**0.00**	**7.50**
Fri	10/6	8:00	12:00	13:00	16:30												**7.50**				**0.00**	**7.50**
Sat	10/7	8:00	12:00	13:00	14:30												**5.50**				**0.00**	**5.50**
Sun	10/8																**0.00**				**0.00**	**0.00**
Mon	10/9	8:00	12:00	13:00	16:30												**7.50**				**0.00**	**7.50**
Tue	10/10	8:00	12:00	13:00	16:30												**7.50**				**0.00**	**7.50**
Wed	10/11	8:00	12:00	13:00	16:30	21:15	21:30								7.50		**7.75**				**0.00**	**7.75**
Thu	10/12	8:00	12:00	13:00	16:30										7.50		**7.50**				**0.00**	**7.50**
Fri	10/13	8:00	12:00	13:00	16:30												**7.50**				**0.00**	**7.50**
Sat	10/14	8:00	12:00	13:00	14:30												**5.50**				**0.00**	**5.50**
Sun	10/15																**0.00**				**0.00**	**0.00**
																	0.00				**0.00**	**0.00**
TOTALS															30.00	0.00	86.50	0.00	0.00	0.00	0.00	86.50

	Charge to:		
	Notation	CC/LC	%
1	Chignik	11340623/11340623	100%
2			
3			
4			
		Total	100%

	Comments		Comments
10/1		10/9	
10/2		10/10	
10/3		10/11	Boatgate standby
10/4	Boatgate standby	10/12	Boatgate standby
10/5	Boatgate standby	10/13	
10/6		10/14	
10/7		10/15	
10/8			

We certify that the information provided above is true and correct.

Employee's Signature Date:

Supervisor's Signature Date:

Approving Officer Signature Date:

Leave Use Codes

H=Holiday X=Comp Ann
S=Sick Y=Comp Pers
A=Annual C=Court
P=Personal L=LWOP

**** Premium Pay Codes (PPC)**

110 - Sea Duty 250 - Straight Time
206 - Hazard 251 - Overtime
211 - Standby

Holiday, Leave, Overtime and Premium Pay Overrides

**Codes	Hours	CC/LC
Leave & Holiday	0.00	No code needed for Leave & Holiday

Chignik Management Area Salmon Escapement Sampling Operational Plan, 2007

by

Mark A. Stichert

April 2007

Alaska Department of Fish and Game **Division of Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

CHIGNIK MANAGEMENT AREA SALMON ESCAPEMENT SAMPLING OPERATIONAL PLAN, 2007

by

Mark A. Stichert

Alaska Department of Fish and Game
211 Mission Road
Kodiak, Alaska 99615

April 2007

The Regional Information Report Series was established in 1987 and was redefined in 2006 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric, and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: http://www.sf.adfg.ak.us/statewide/divreports/html/intersearch.cfm.

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ABSTRACT

The Alaska Department of Fish and Game (ADF&G) samples sockeye salmon *Oncorhynchus nerka* at the Chignik River weir for age, length, and sex determination to provide information for preseason run forecasts, escapement goal evaluation, and run reconstruction. Every week throughout the season, 240 sockeye salmon are sampled. Sockeye salmon scales are collected using establish protocols common to the Westward Region. This report summarizes the specific procedures for the sockeye salmon escapement sampling program.

Key words: Chignik Management Area, escapement, sockeye salmon, scale samples, 2007 management

INTRODUCTION

The Chignik Management Area (CMA; Area L) includes all coastal waters and inland drainages on the south side of the Alaska Peninsula between Kilokak Rocks and Kupreanof Point (Figure 1). The CMA is bordered by the Alaska Peninsula Management Area (Area M) to the west and the Kodiak Management Area (Area K) to the east. The CMA is divided into five districts: the Eastern, Central, Chignik Bay, Western, and Perryville districts (Figure 2). These districts are further broken down into sections and statistical reporting areas (Figure 2). The Chignik River system is the largest sockeye salmon *Oncorhynchus nerka* producer within the CMA. The Chignik weir and field office facility is located three miles upstream from the Chignik Lagoon.

Annually, the Alaska Department of Fish and Game (ADF&G) samples sockeye salmon from the Chignik River escapement for biological characteristics (age, sex, and length; ASL). These samples provide the foundation for preseason run forecasts, escapement goal evaluation, and accurate assignment of the run to stock of origin (run reconstruction). Therefore, it is important that all data are collected following established protocols.

GOAL

The goal of this project is to provide ASL composition data from the Chignik River sockeye salmon escapement to assist with commercial fishery management.

OBJECTIVES

1. Collect a random sample of 240 sockeye salmon per statistical week for ASL data at the Chignik weir.
2. Collect a random sample of 1,200 sockeye salmon from the outlet of Black Lake for ASL data.

SUPERVISION

Finfish research biologist Matt Foster is the Westward Region scale sampling project leader and will supervise inseason progress. Mark Stichert, the Chignik Area Management Biologist, will serve as the project biologist. The project biologist will schedule and monitor Chignik weir and Black Lake sampling, review all data for quality, quantity, and timeliness and provide feedback to the sampling crew regarding data quality. Qualified Chignik weir staff will determine the age of all sockeye salmon scales. A logbook will be maintained by the project biologist tracking weekly samples.

PROCEDURES

SOCKEYE SALMON

Escapement Sampling

A fish trap incorporated into the Chignik River weir will be used to capture fish for ASL sampling. Sockeye salmon will be randomly sampled from the trap for ASL data using methods described in Appendices A1 through A7. All scales, when possible, will be collected from the preferred area of each fish following procedures outlined in INPFC (1963). It is essential that samples be representative of the escapement and bias will be avoided by not pre-selecting fish based upon size, sex, condition or any other factor.

During 2007, the sampling weeks start on Thursday and end the following Wednesday. Eighty sockeye salmon will be sampled for ASL data per sampling event on alternating days (e.g., Friday, Monday, Wednesday), totaling 240 ASL samples per statistical week (Thompson 1987). Sampling weeks and corresponding calendar dates are listed in Appendix A4. These data will be clearly marked as "Chignik weir escapement samples" (location code 071; Appendix A3).

If escapement numbers decline and there is concern that the minimum sample size will not be achieved, adjustments in sampling efforts should be implemented so that the weekly goal of 240 is met. The camera gates installed in the Chignik River weir may be closed during the operation of the fish trap to increase the number of fish captured in the weir's fish trap. When the trap catch at the Chignik River weir is not adequate to fulfill ASL sampling needs, additional samples may be collected from the Chignik Lagoon commercial harvest (statistical area 271-10). These data will be clearly marked as Chignik commercial catch samples (location code 072; Appendix A3).

Black Lake Sample

Adult sockeye salmon will be sampled, beginning June 20th, at the outlet of Black Lake. These samples provide a representation of the ASL composition of the early run. Sampling effort and coordination will be lead by the project biologist with support from Chignik management and research staff. If possible, 1,200 sockeye salmon will be sampled over several days with a target of 400 fish during each sampling day. The fish will be collected using a beach seine, and held in an instream live box prior to sampling. The adipose fin will be clipped on all sampled fish to prevent repeat sampling. Fish will be sampled using methods outlined in Appendices A1 through A7. These samples will be clearly marked as "Black Lake escapement samples" (location code 070; Appendix A3).

SAMPLE PROCESSING

Scales will be mounted on scale "gum" cards and impressions made on acetate/diacetate cards using a heat press. Qualified Chignik weir staff will assign sockeye salmon ages by examining scale impressions for annual growth increments using a microfiche reader fitted with a 48X lens following designation criteria established by Mosher (1968). Ages will be recorded on sampling forms using European notation (Koo 1962) where a decimal separates the number of winters spent in fresh water (after emergence) from the number of winters spent in salt water. All data will be recorded on standard ASL optical scanning (Opscan) data forms as outlined in Appendix A1 then scanned and edited for errors. All sockeye salmon scales, scale cards, and completed Opscan forms will be delivered to Matt Foster in Kodiak for archiving. Data collected as part of this project will be reported in ADF&G reports in the fall of 2007.

REFERENCES CITED

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Mosher, K. H. 1968. Photographic atlas of sockeye salmon scales. Bureau of the U.S. Fish and Wildlife Service. Fishery Bulletin 67(2):243-280.

Thompson, S. K. 1987. Sample size for estimating multinomial proportions. The American Statistician 41 (1):42-46.

FIGURES

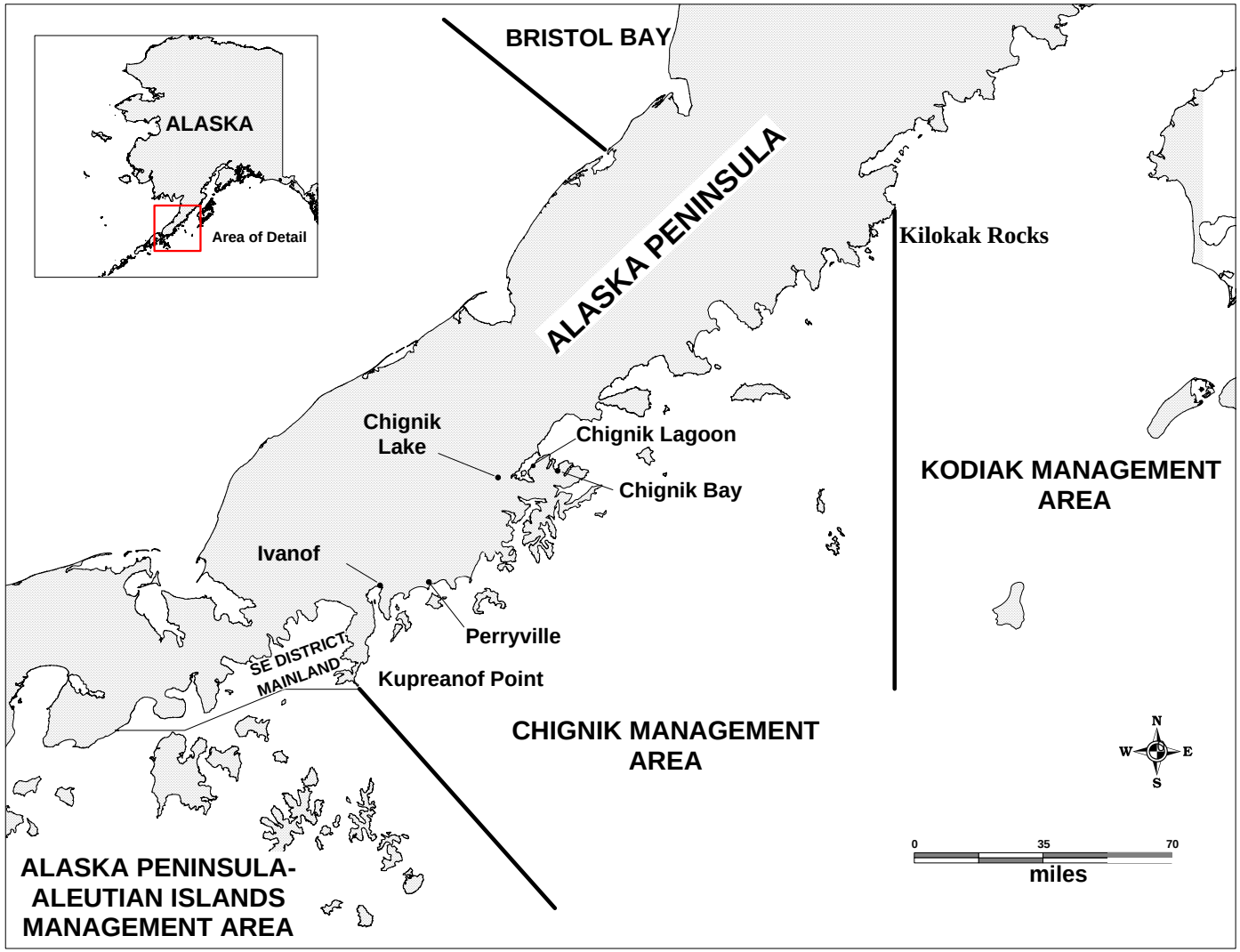


Figure 1.-Map of the Alaska Peninsula illustrating the relative locations of the Chignik, Kodiak, and Alaska Peninsula Management Areas.

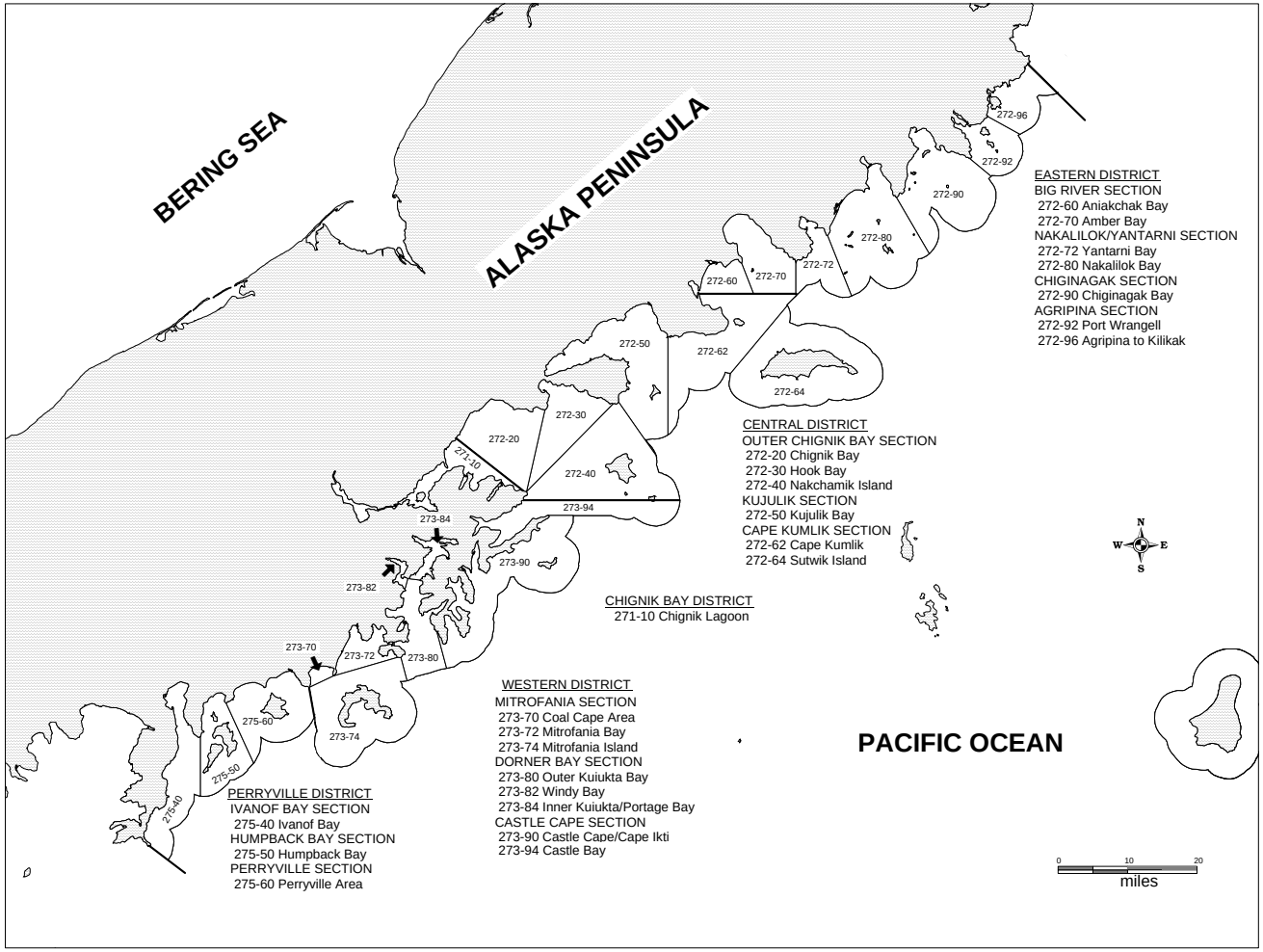


Figure 2.-Map of the Chignik Management Area illustrating commercial salmon fishing district boundaries and statistical areas.

APPENDIX A: SAMPLING PROCEDURES

Appendix A1.-Procedure for sampling adult salmon for age, sex, and length**.**

Annually, salmon escapements and catches are sampled for age (scales), length, and sex by field crews throughout the state. This database is essential for sound management of the state's salmon resources.

To be useful, data must be recorded on the age, sex, length (ASL) optical scanning (Opscan) forms neatly and accurately. In addition, scale samples must be collected and mounted properly to ensure accurate age determination. The following procedures are to be strictly adhered to when sampling adult salmon for age, length, and sex.

PROCEDURES

COMPLETING THE OPSCAN AWL FORMS:

New **green** colored Opscan forms have been developed which have Y2K date capabilities. Before transcribing any information, make sure the correct form is being used.

A completed Opscan form and accompanying scale gum card for sampling sockeye salmon are shown in Appendix A2.

Complete each section on the left side of the Opscan form using a No.2 pencil and darken the corresponding circles as shown in the figures. Make every effort to darken the entire circle as the optical scanner, which reads and records the data from the Opscan forms, may not recognize partially filled circles. Label only one form at a time to avoid a "carbon paper effect" resulting in stray marks. Special care should be used to ensure that stray marks do not occur on either side of the Opscan form. Stray marks and scuffed forms can severely hamper scanning.

Fill out each of the following:

Description

Record the following: species/area/catch or escapement/gear type (if applicable)/samplers.

Card

The Opscan forms and corresponding gum card(s) are numbered sequentially by date throughout the season starting with 001. A separate numbering sequence will be used for each species, district, and geographic location. Consult your crew leader for the current card number. Sockeye salmon scale samples will have only one gum card per Opscan form as shown in Appendix A2.

Species

Refer to the reverse side of the Opscan form for the correct one-digit code (e.g., sockeye = 2).

Day, Month, Year

Escapement sampling: Use appropriate digits for the date the fish are sampled.

Catch sampling: use the date the fish were caught. If this differs from the sample date, note the sample date in the top margin.

District

List all districts in which the fish were caught. Consult your area statistical map or project leader for the appropriate district. If more than one district is represented, darken the corresponding circles of the district representing most of the catch and note the other catch areas in the top margin.

Subdistrict (Section)

List all sections in which the fish were caught. If the catch represents more than one section, list each section but do not darken the corresponding circles. Leave blank if the section is unknown.

Stream

Leave blank for catch sampling;

Consult area statistical map for the appropriate stream number when collecting escapement samples (Figure 2).

Location

List the appropriate code associated with the area the fish were sampled as shown in Appendix A3. For example, if the fish were sampled in the Port of Kodiak, the location code would be 031.

-continued-

Period

Escapement sampling: list the sample week in which the fish were sampled (Appendix A4.).

Catch sampling: list the sample week in which the fish were caught. If this differs from the week the fish were sampled, note this in the top margin.

Project and Gear

Refer to the reverse side of the Opscan form for the correct code. For example, escapement samples collected at a weir would have a project code of 3 and a gear code of 19.

Mesh

Leave blank unless specifically instructed by supervisor to do otherwise.

Type of length measurement

Refer to the reverse side of the Opscan form for the correct code (e.g., mid eye to tail fork = 2). Refer to Appendix A.5.

Number of scales per fish

Fill in the number of scales collected per fish. For sockeye, one scale per fish is collected unless otherwise instructed by supervisor.

# of cards

# of cards always = 1 (each Opscan form has an individual and unique "litho code").

If possible, keep the Opscan forms in numerical order throughout the season and keep all forms flat, dry, and clean. Fish gurry and water curling may cause data to be misinterpreted by the optical scanning machine. **It is the responsibility of the crew leader to make sure that all forms are carefully edited before returning them to their supervisor.**

SCALE GUM CARDS

A completed Opscan form and accompanying gum card for sampling sockeye salmon are shown in Appendix A2. Be sure to fill out the gum cards in pencil as shown in Appendix A2.

Species

Write out completely (e.g., sockeye).

Locality

Escapement sampling: include the weir site followed by "escapement" (e.g., Chignik River escapement).

Catch sampling: include the area(s) where the fish were caught followed by "catch" (e.g., Chignik Bay catch).

Statistical Area Code

Fill in the appropriate digits from the Opscan form. If catch samples are from a variety of statistical areas be sure to list each statistical area and approximate percentage from each (if available).

Sampling date

Escapement sampling: fill in the date the fish were sampled.

Catch sampling: fill in the date the fish were caught. The sample date, if different from the catch date, may be noted in "remarks".

Gear

Write out completely. If catch samples include multiple gear types, be sure to list each gear and approximate percentage from each (if available).

Collector(s)

Record the last names of each person collecting the sample.

-continued-

Remarks

Record any pertinent information such as the number of scales per fish sampled, processing facility where the sampling took place, vessel/tender name, etc. Be sure to transfer this information to the top margin of the Opscan form.

SAMPLING PROCEDURE

1. Place the fish on its right side to sample the left side.
2. Determine the sex of the fish (escapement sampling only) and darken M or F in the sex columns. If any difficulty is encountered with this procedure, write "I had trouble sexing these fish" on the top margin of the Opscan form and ask your supervisor for help as soon as possible before sexing additional fish.
3. Measure fish length in millimeters from mid eye to tail fork (escapement sampling only; Appendix A5). Record length by blackening the appropriate column circles on the Opscan form. Column 3 on the form is used for fish with a length greater than 999 millimeters (e.g., Chinook). Measure all species of salmon to the nearest mm. When collecting length data, take care to ensure that each length corresponds to the appropriate scale mounted on the gum card, as length-at-age is evaluated for each sample.
4. Remove the "preferred scale" from the fish by grasping the scale's exposed posterior edge with forceps and pulling free (Appendix A6). Remove all slime, grit, and skin from the scale (neoprene wristers work well for this). The preferred scale is located on the left side of the fish, two rows above the lateral line on the diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin. If the preferred scale is missing, select a scale within the preferred area on the other side of the fish. If no scales are present in the preferred area on either side of the fish, sample a scale as close to the preferred area as possible and darken the 8 under "age error code" on the Opscan form. Do not select a scale located on the lateral line.
5. It is important to take care that scales adhere to the gum card, rough (exposed) side up. Therefore, without turning the scale over, clean, moisten, and mount the scale on the gum card with your thumb or forefinger. Exert just enough pressure to spread and smooth the scales directly over the number as shown in Appendix A6. The ridges on the sculptured side can be felt with a fingernail or forceps. Mount the scale with the anterior end oriented toward top of gum card. All scales should be correctly oriented on the card in the same direction (Appendix A7).
6. Repeat steps 1 through 4 for up to 40 fish on each Opscan form.
7. When sampling at weirs you may use "Rite in the Rain"® books to record the data. Keep the Opscan forms in camp where they will be clean, dry, and flat. After sampling is done for the day, transfer the data to the AWL forms. **Each length, sex, and scale must correspond to a single fish! It is the responsibility of the crew leader to be sure the data has been transcribed correctly and the Opscan forms filled out completely. Log books containing length and sex data should be returned to Matt Foster at the end of the season**. These are considered raw data and need to be archived. If you choose to record raw data on audio tape, these tapes must be returned to Matt Foster.

SAMPLING CHECKLIST

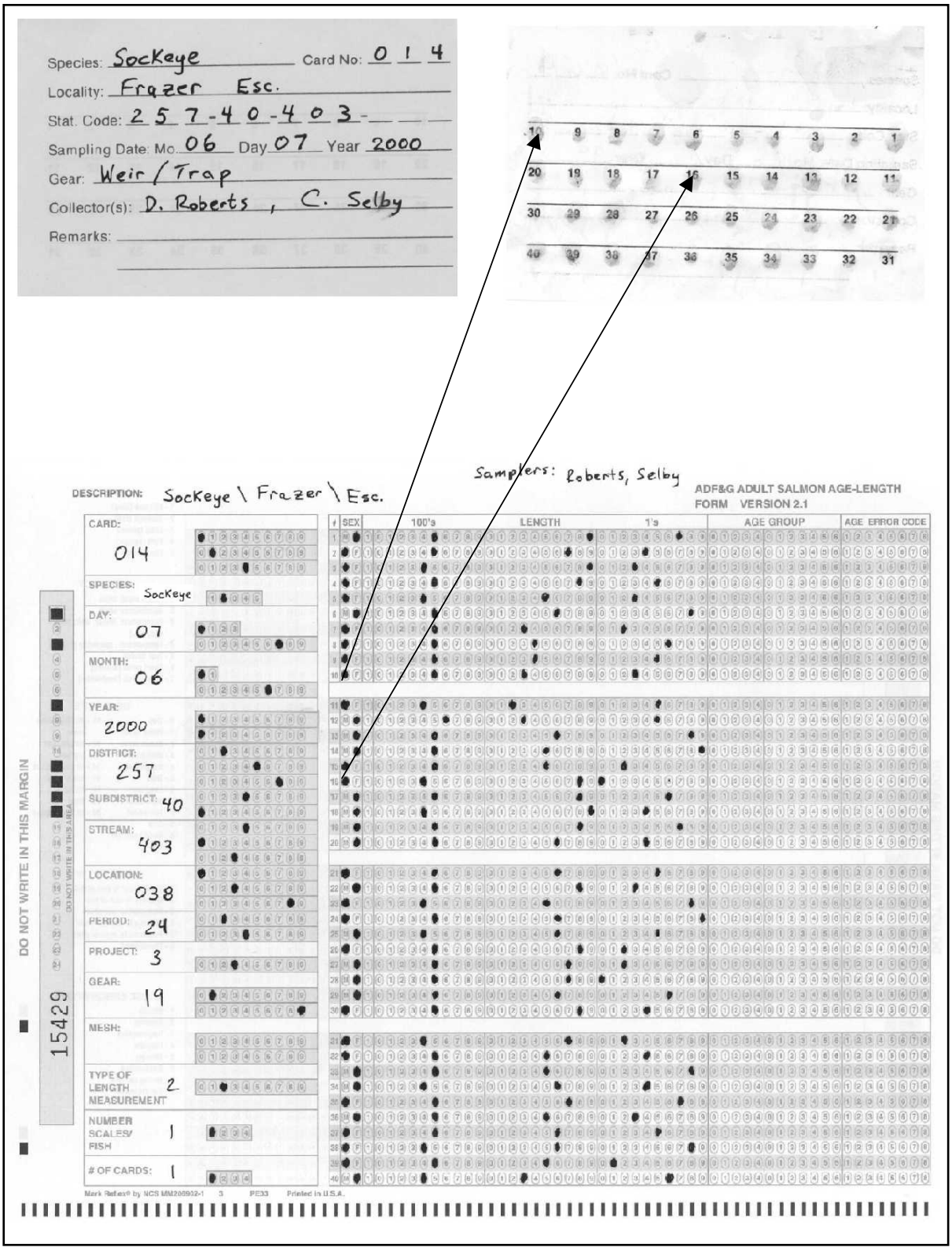
OPERATIONAL PLAN	PENCILS (NO. 2)
GUM CARDS	FORCEPS
OPSCAN FORMS (**GREEN**)	PLASTIC CARD HOLDERS
NEOPRENE WRISTERS	CLIPBOARD
MEASURING BOARD	LOG BOOK

-continued-

SOME REMINDERS

1. For greater efficiency in scale reading, mount scales with anterior end toward top of gum card.
2. Opscan forms should be carefully edited. Remember to use the new Opscan forms (green) as the old red and blue forms are outdated. Re-check header information on forms; make sure all available information is filled in. Take extra care to use the correct period code (sampling week) for the sampling or catch date. Opscan form numbers should not be repeated; a frequent error is to begin a week's sample with the last Opscan number used the week before. This is particularly important if the data is regularly sent to town; it is easy to forget which Opscan form numbers were used. Crew leaders should take time to ensure that the circles are being blackened correctly. If the circles are sloppily marked, the optical scanner records the information incorrectly or misses it entirely.
3. Transfer important comments from the gum cards to the Opscan forms. After pressing scales, the cards are seldom referred to again, and important remarks can be lost. Write comments in the top right margin. If there is not room on the Opscan form to completely explain the remarks, use a separate piece of paper.
4. Never put data from different dates on one Opscan form or one gum card. Even if only one scale is collected that day, begin a new Opscan form and gum card the next day.
5. If weights are taken, they may be noted in the right margin of the Opscan form during sampling, but be sure to transfer the weights and litho code to the appropriate columns on the reverse of the Opscan form before submitting it to your supervisor.
6. Try to keep the litho codes (located in the left margin of the Opscan form) in numerical order. This should not be hard to do if they are arranged that way before page numbering. When sampling different areas throughout the season, arrange the litho codes in order before each sample is taken.
7. If Opscan forms get wrinkled or smeared the data should be transcribed onto a new Opscan form prior to sending in. The optical scanning computer will misread or reject torn or wrinkled sheets. Do not use paperclips on Opscan forms.
8. Be careful when collecting and mounting scales in wet conditions (rain, high humidity, etc.). If glue dries on top of the scale, it often obscures scale features, resulting in an unreadable scale. In addition, scales frequently adhere poorly to a wet gum card. Protect the cards and keep them dry to avoid having to remount the scales on a new card. If the cards get wet, try to dry them in a protected area or remount if necessary. Remember, use a pencil when filling out gum cards, because ink will come off during pressing.
9. Visually scan all Opscan forms for mistakes. A common error occurs, for instance, in placing both the 4 and 7 of a 475mm fish in the 100s column with nothing in the 10s column.
10. Avoid accumulation of incomplete Opscan forms. In previous years, there have been cases where individuals have completed several samples before transcribing the information on the Opscan forms. This may lead to an increase in errors. After a sample has been completed, try to get the Opscan forms filled out as soon as possible. This will ensure more accurate information, as any problems or abnormalities concerning the sample (e.g., many jacks in sample, many fish lacking preferred scale, number of scales do not match number of lengths recorded, etc.) will be fresh in your mind.
11. Responsibility for accuracy lies first with the primary data collector(s) and finally with the crew leader. Sloppy or incomplete data forms or gum cards will be returned to individual collectors for correction.

Appendix A2.-Completed adult salmon Opscan form (front side) and associated gum card.



Appendix A3.-Assigned port and weir location codes.

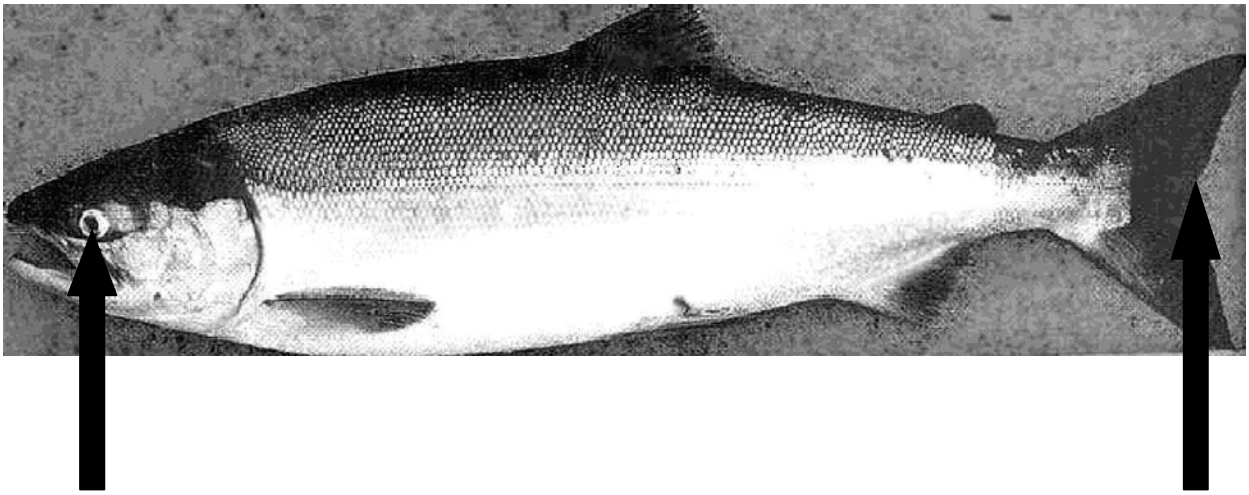
PORT AND LOCATION CODES

029	Uganik	048	Waterfall Bay (WBTHA)
030	Lazy Bay	049	Little River
031	Port of Kodiak	050	King Cove
032	Pauls Lake	051	Port Moller
033	Thorsheim	052	Dutch Harbor
034	Afognak River	053	Akutan
035	Karluk River	054	Sand Point
036	Ayakulik (Red River)	055	Bear River
037	Upper Station	056	Nelson River
038	Frazer Lake	057	Canoe Bay
039	Dog Salmon	058	Ilnik Lagoon
040	Akalura River	059	Orzinski River
041	Uganik River	060	Sandy River
042	Malina Creek	061	Thin Point Lagoon
043	Portage Lake	062	Middle Lagoon
044	Foul Bay (FBTHA)	070	Black Lake
045	Larsen Bay	071	Chignik Weir
046	Spiridon (SLTHA)	072	Chignik (Processing facilities)
047	Little Kitoi		

Appendix A4.-Sampling weeks and associated calendar dates, 2007.

Week	Calendar Dates	Week	Calendar Dates
10	1-Mar - 7-Mar	28	5-Jul - 11-Jul
11	8-Mar - 14-Mar	29	12-Jul - 18-Jul
12	15-Mar - 21-Mar	30	19-Jul - 25-Jul
13	22-Mar - 28-Mar	31	26-Jul - 1-Aug
14	29-Mar - 4-Apr	32	2-Aug - 8-Aug
15	5-Apr - 11-Apr	33	9-Aug - 15-Aug
16	12-Apr - 18-Apr	34	16-Aug - 22-Aug
17	19-Apr - 25-Apr	35	23-Aug - 29-Aug
18	26-Apr - 2-May	36	30-Aug - 5-Sep
19	3-May - 9-May	37	6-Sep - 12-Sep
20	10-May - 16-May	38	13-Sep - 19-Sep
21	17-May - 23-May	39	20-Sep - 26-Sep
22	24-May - 30-May	40	27-Sep - 3-Oct
23	31-May - 6-Jun	41	4-Oct - 10-Oct
24	7-Jun - 13-Jun	42	11-Oct - 17-Oct
25	14-Jun - 20-Jun	43	18-Oct - 24-Oct
26	21-Jun - 27-Jun	44	25-Oct - 31-Oct
27	28-Jun - 4-Jul	45	1-Nov - 7-Nov

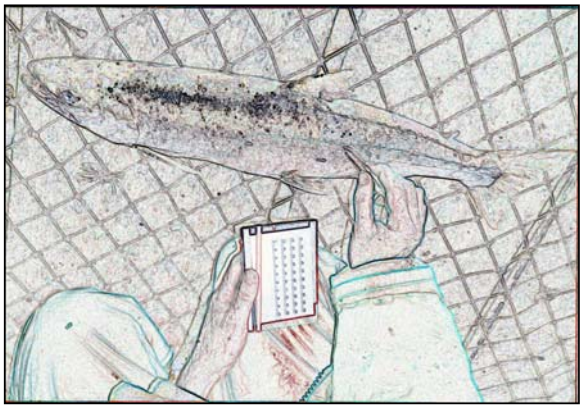
Appendix A5.-Measuring fish length from mid eye to tail fork.

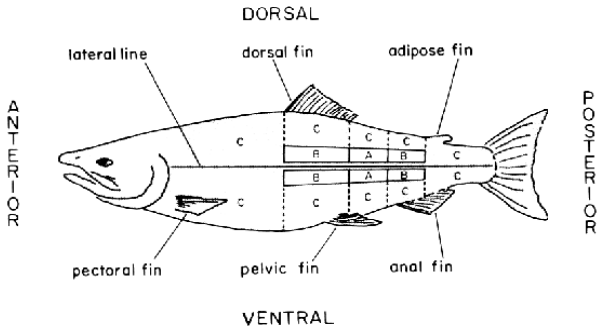


Adult salmon length is measured from mid eye to tail fork because the shape of the salmon's snout changes as it approaches sexual maturity. The procedure for measuring by this method is as follows.

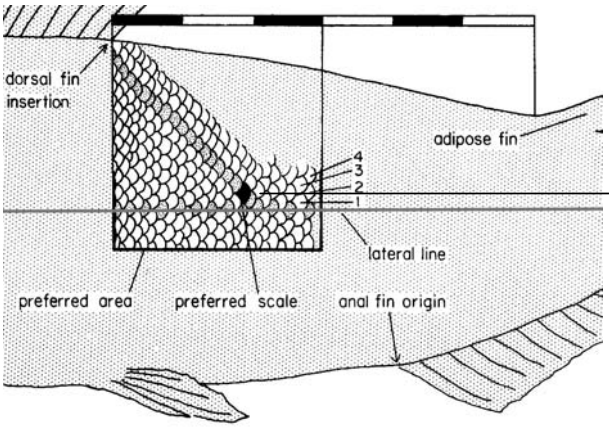
1. Place the salmon flat on its right side (on the measuring board) with its head to your left and the dorsal fin away from you.
2. Slide the fish in place so that the middle of the eye is in line with the edge of the meter stick and hold the head in place with your left hand.
3. Flatten and spread the tail against the board with your right hand.
4. Read and record the mid eye to tail fork length to the nearest millimeter.

Appendix A6.-Removal and mounting of the preferred salmon scale.

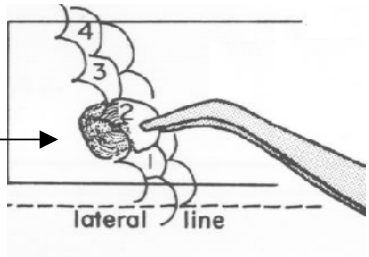


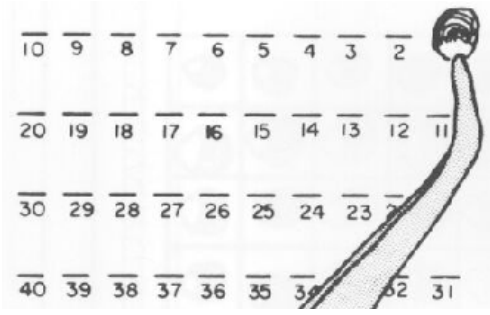


<u>INPFC rated areas for scale removal</u>. Area A is the preferred area. If scales on the left side are missing, try the right side. Area B is the second choice if there are no scales in area A on either side of the fish. Area C designates non preferred areas.



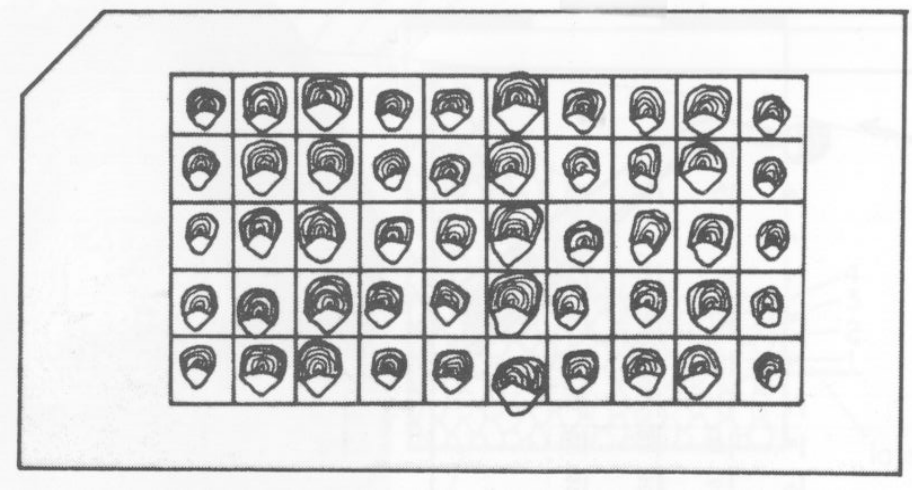
Do not turn scale over.



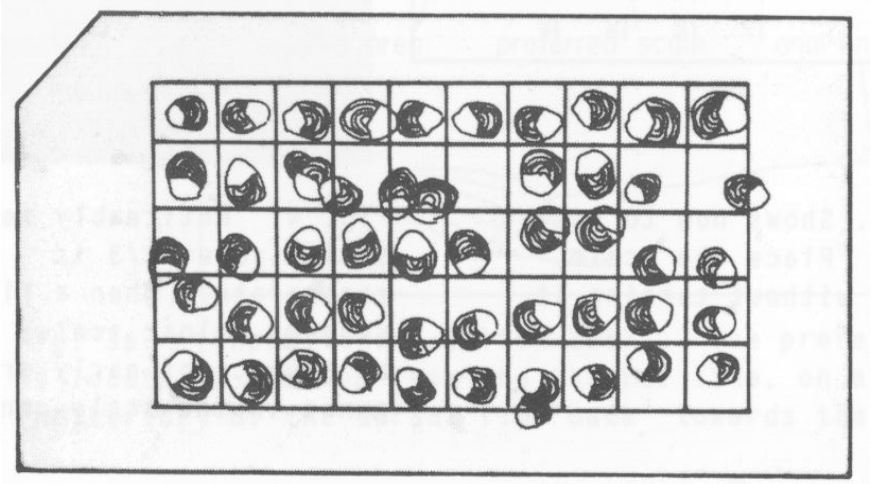


The preferred scale in this diagram is solid black. It is located 2 rows up from the lateral line, on a diagonal from the insertion (posterior) of the dorsal fin "back" toward the origin of the anal fin.

Appendix A7.-Scale orientation on the salmon scale gum card.



The scales are all correctly oriented on the card in the same direction, with the anterior portion of the scale pointed toward the top of the card and the posterior portion (which is that portion of the scale held in the forceps) pointed toward the bottom of the card.



The scales are incorrectly oriented in different directions. This increases the time spent to age samples.

Chignik River Smolt Enumeration Project Operational Plan, 2007

by

Heather Finkle

April 2007

Alaska Department of Fish and Game **Division of Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

CHIGNIK RIVER SMOLT ENUMERATION PROJECT OPERATIONAL PLAN, 2007

by

Heather Finkle

Alaska Department of Fish and Game
Division of Commercial Fisheries
211 Mission Road, Kodiak, Alaska 99615

April 2007

The Regional Information Report Series was established in 1987 and was redefined in 2006 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric, and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: http://www.sf.adfg.ak.us/statewide/divreports/html/intersearch.cfm.

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ABSTRACT

This report describes the equipment and protocol used to collect data for the fourteenth year of the Chignik River sockeye salmon smolt enumeration project. Sockeye salmon smolt will be identified and enumerated after capture by two rotary screw traps positioned upstream of the Chignik River weir from April 27 to approximately July 7, 2007. Sockeye salmon smolt will be measured throughout the emigration for age, length, and weight data, and genetic samples will be collected from these same fish. Sockeye salmon smolt abundance will be estimated using mark-recapture techniques. These data will be analyzed and presented in both oral and written forms to describe sockeye salmon smolt condition and to provide an estimate of the total sockeye salmon outmigration from the Chignik watershed. These data will also be used to estimate marine survival and forecast returns of adult Chignik watershed sockeye salmon.

Key words: Chignik, sockeye salmon, rotary screw trap, mark-recapture, smolt forecast.

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) has been commissioned by the Chignik Regional Aquaculture Association (CRAA) since 1994 to enumerate the annual sockeye salmon smolt emigration in the Chignik River from approximately the end of April to the beginning of July. This project seeks to gauge the health of the sockeye salmon smolt leaving the system, estimate marine survival, and provide a preseason forecast of the Chignik River watershed sockeye salmon run.

Economically, sockeye salmon *Oncorhynchus nerka* are the most important commercial salmon species in the Chignik Management Area (CMA). The Chignik River watershed is the primary sockeye salmon producer in the CMA (Figure 1). Over the last 13 years, annual runs to the Chignik River have ranged from 1.5 to 4.4 million adult sockeye salmon (Witteveen and Botz 2004). There are two rearing lakes and two distinct sockeye salmon runs in the Chignik River watershed. Sockeye salmon that spawn in Black Lake and its tributaries return from about May through July, and those that spawn in Chignik Lake and its tributaries return from about July through September (Witteveen and Botz 2004).

This project provides information on the Chignik River juvenile sockeye salmon population size, dynamics, and the physical health of the sockeye salmon smolt. Coupled with basic limnology and genetic data, this information may allow the modeling of potential juvenile sockeye salmon rearing capacity of the Chignik River watershed. This information will be used for evaluating current escapement goals, forecasting future adult returns, and estimating ocean survival. Additional years of data in the smolt database will provide increasing insight into run size fluctuations and lead to more accurate forecasting.

GOAL

The project goal is to evaluate and document the Chignik River watershed sockeye salmon smolt production trends.

OBJECTIVES

1. Estimate the total number of emigrating sockeye salmon smolt, by age class, from the Chignik River watershed,
2. Describe sockeye salmon smolt emigration timing and growth characteristics (length, weight, and condition factor), by age class and stock, for the Chignik River watershed,

3. Continue to build a smolt database to estimate smolt-to-adult survival and to forecast future runs, and
4. Summarize the 2007 smolt emigration data in a report.

TASKS

1. Install, operate, and maintain a rotary screw smolt trap array to capture a portion of the sockeye salmon smolt outmigration.

   Target date: April 27 through July 7.

2. Enumerate the daily smolt trap catch by species.
3. Collect weekly samples of 200 sockeye salmon smolt (40 smolt per day for five consecutive days) for age, weight, and length (AWL) data.
4. Collect genetic samples from all AWL sampled fish.
5. Perform mark-recapture experiments by dying and releasing 3,000 (1,000 minimum) sockeye salmon smolt once every 5 days, to estimate trap efficiency and the total smolt outmigration. In conjunction with each mark-recapture experiment, a mark-retention/delayed mortality experiment will be conducted.
6. Collect physical data daily: air temperature, water temperature, relative water depth, cloud cover, precipitation, and wind direction and velocity.
7. Inventory and store equipment.

   Target date: July 15.

8. Write Project Summary Report and deliver a general presentation on the smolt project to Chignik Lake High School students.

   Final report due date: March 15, 2008. School presentation: Before end of semester in May 2007.

SUPERVISION

Project Biologist:	Heather Finkle – Fisheries Biologist II (PCN 11-1273)
Crew Leader:	Darin Ruhl - Fisheries Biologist I (PCN 11-1426)
Crewmember:	Vacant – Fish and Wildlife Technician II (PCN 11-5191)

The crew leader will schedule daily tasks and will oversee and participate in all field operations regarding the smolt project. The crewmember will assist the crew leader in all assigned tasks and field operations. The Project Biologist will oversee the study and provide logistical and technical support. All project members will work as a team to complete the project's goal. Technical or policy questions will be directed to the Project Biologist. The Chignik Area Management Biologist oversees and is responsible for all ADF&G operations at Chignik. The smolt project research staff will work cooperatively with management staff and the public.

METHODS

TRAP INSTALLATION

The traps will be constructed and installed following the guidelines in Appendix A1. Two rotary screw traps (1.5-m and 2.4-m cone diameters) will be positioned in the Chignik River at the same location as in previous years (Figure 2). The traps will be marked clearly with strobe lights to avoid nighttime conflicts with boat traffic. The traps will be operated in tandem (small trap closer to shore) perpendicular to the stream flow and attached to the shore. The water velocity should be approximately 5 ft/s (~1.5 m/s) at the trap location to provide a trap operating speed of about 5-8 revolutions per minute (rpm). To reduce smolt avoidance, each trap will be relocated laterally (as the river flow fluctuates), to fish as far offshore as possible without jeopardizing the trapping equipment. After the traps are installed, a river depth profile at the trapping site (1-m intervals) and a schematic diagram will be completed.

SMOLT TRAPPING AND ENUMERATION

The screw traps will operate continuously throughout the sampling season, which is approximately from May 1 to June 5, 2007. A trapping day will be defined as a 24-hour period from NOON to NOON, with the date corresponding to the calendar date of the first 12-hour period. Time will be recorded in military (24-hour) format. The traps will be checked hourly during dark hours, and approximately every six hours during the day. The traps will be checked, cleaned, and emptied daily at noon. It is extremely important to monitor the traps closely because smolt migration rates are variable and unpredictable: excessive mortality can occur quickly if smolt are crowded in the trap. The traps will be kept clear of debris, as increased flows and detritus may cause death or injury to captured smolt.

Each time the traps are checked, all species will be identified and counted. Various identification keys (e.g., Pollard et al. 1997; Appendix B1.) will be available and care will be taken to ensure proper identification. If identification by external characters proves difficult, a small number of fish will be sacrificed and internal characters will be examined. All fish of each species will be counted using a hand counter to facilitate accuracy. Each time the trap is checked, all counts, including mortalities, will be recorded on the DAILY SMOLT TRAP CATCH REPORTING FORM (Figure 3). If it becomes necessary to count continuously because of high fish abundance, the tally will end for each species at the end of each hour. The data will be recorded, and a new tally will begin for the next hour. All counts will be summarized on the SOCKEYE SALMON SMOLT REPORTING FORM (Figure 4) on a daily basis.

If direct counting is impossible because of high smolt catches, it will be necessary to estimate the trap catch using the catch-weight method. The crew will be prepared to estimate the catch using this method well before large migrations begin as there is no preparation time when catch numbers become large. It may not be necessary to use the catch-weight method on both traps simultaneously; it is desirable to count individual fish when possible. It is also desirable to keep an individual tally for each trap during catch-weight enumeration. The methods for the catch-weight estimation technique are

1. A sample of approximately 150 fish will be dipnetted from the trap(s) and weighed. This sample should be representative of the fish in the trap. This weight will be the reference weight for the next samples. The weight of the sample will be recorded in a field notebook.

2. The sample will be enumerated, by species, and any marked fish will be noted. These data will be recorded in a field notebook and the fish will then be released.
3. Subsequent samples will be taken from the trap(s). The weight of these samples will be measured and recorded, and the fish will be released.
4. A new reference weight will be taken every 10^{th} sample or earlier if size or species compositions noticeably change.
5. Catch-weight data will be transferred to the CATCH-WEIGHT WORKSHEET (Figure 5) when passage rates slow.

Any data generated by this method will be clearly marked on the data sheets.

SMOLT AGE, WEIGHT, AND LENGTH SAMPLING

A sample of 40 sockeye salmon smolt will be collected for five consecutive days per statistical week and sampled for AWL data (Appendix C1. through C5.). All smolt sampling data will reflect the smolt day in which the fish were captured, and samples will not be mixed between days. If less than 40 sockeye salmon smolt are captured in a day, all available smolt will be sampled for AWL data. If greater than 40 smolt are captured, a sample of smolt will be collected hourly throughout the night's migration and held in an instream live box. The number of fish sampled hourly will be proportional to the migration strength. At the end of the smolt day, 40 smolt will be randomly collected from the live box and sampled. The remaining smolt will be released. It is important that the smolt sample represent the entire night's migration. These data are used to reconstruct the age class component of the emigration, and smolt of different sizes and ages may travel in separate schools throughout the night.

The age of the sampled fish will be estimated postseason by interpreting the growth patterns on their scales following the methods and notation of Koo (1962).

GENETIC SAMPLING

All AWL sampled fish will have tissue samples taken for future DNA analysis. The methods for sample collection are outlined in Appendix D1. The sample procedures in Appendix D1 are written for the non-lethal and lethal sampling of smolt. It should be noted that for juvenile sockeye salmon less than 65 mm, it may be necessary to retain the whole fish as a sample. Samples should not exceed one-third of the volume of the sample vial. Labeled samples will be shipped to the ADF&G Gene Conservation laboratory for storage and processing.

MARK-RECAPTURE EXPERIMENTS

Trap efficiency estimates will be made every five days to estimate the number of sockeye salmon smolt emigrating from the Chignik River, or sooner if the trap is moved. Bismarck Brown Y dye will be used to mark a sample of fish. The marked fish will be transported upstream of the trap to the release site (Figure 2). All smolt caught in the trap will be examined for marks, unless high catch volumes require the use of the catch-weight method. The proportion of recaptured fish will be used to estimate the proportion of the total emigration that is captured in the trap. The assumptions for mark-recapture experiments are

1. Mortality rates are equal between marked and unmarked fish.
2. All recaptured fish are recognized as such.
3. All marked fish do not lose their marks.

4. Marked and unmarked fish behave similarly.

Every effort will be made to conform to these assumptions. The marking process can be very stressful for smolt, and care will be taken to avoid stressing the marked fish. The primary causes of mortality are excessive handling, high water temperatures, low levels of dissolved oxygen, and exposure to the dye. The marked smolt will be released into the river at a point far enough upstream to ensure mixing with the unmarked population at a time when the migration for the evening is imminent.

The following methods will be used for marking and releasing smolt:

1. All data will be recorded on the SMOLT DYE RELEASE FORM (Figure 6).
2. Every five days, a sample of approximately 3,000 sockeye salmon smolt will be collected for marking. If run strength is not sufficient to capture all the smolt in one day, smolt will be held in an instream live box for up to three days. After the third evening, all smolt collected will be marked. Marked fish will not be sampled for AWL information.
3. The fish will be transferred from the instream live box to two 32-gallon transport/marking containers. The containers will then be covered. A water pump will be used to gently exchange the water in the containers. The smolt will be allowed to rest in the container for at least 30 minutes.
4. The circulation pumps will be turned off, and a solution of 6.1 g of Bismarck Brown Y dye will be dissolved in each container. Three aerator units will be placed in the marking containers and will operate continuously during the dyeing period. After 15 minutes in the dye, the pump will be restarted and the containers will be flushed with fresh water. The dye solution should be extremely dilute after 20 minutes of flushing.
5. Following the dye treatment, the containers will be flushed with fresh water for a minimum of 90 minutes. Smolt displaying abnormal behavior will not be released.
6. Smolt showing normal behavior will be dipnetted from the recovery containers, counted, transferred to 5-gallon buckets equipped with aerators and transported upstream to the release site (Figure 2). At the release site, the smolt will be evenly distributed across the stream by slowly pouring the smolt out of the 5-gallon buckets. It is imperative that the smolt are released on the downstream side of the boat to reduce the probability of prop wash mortality or injury. The dye treatment and recovery process should be timed so that the release takes place at approximately 2300 hours.
7. The smolt trap will be monitored for recaptured marked fish beginning the day of release and continue through the next marking event. The number of marked fish will be observed and recorded on the DAILY SMOLT CATCH REPORTING FORM (Figure 3) and the SOCKEYE SALMON SMOLT SUMMARY FORM (Figure 4). The number of smolt examined will equal the number of marked smolt plus the number of unmarked smolt caught each day. The daily smolt catch will not include marked smolt, since these fish have been previously counted when they were collected to be marked.
8. In the event that it is necessary to use the catch-weight method to count smolt during a dye test period, the number of fish examined for marks will be the number of fish

counted in the reference weight samples only. The total number of marked fish recovered will be extrapolated from the catch weight method. Data generated from the catch-weight method will be clearly labeled.

Trapping conditions will be held constant between marking events. Modifications to the trap, including adjustments in lighting and trap location, will be made immediately before a marking event. If major changes in river flow rates or smolt migration patterns are noticed, a new marking event will follow as soon as possible. The Project Biologist will be consulted before any trap modifications are made unless immediate modifications are necessary to prevent loss of equipment or to prevent major smolt mortality. Any changes will be clearly documented in the daily log and in the comments section of the data forms.

MARK RETENTION/DELAYED MORTALITY EXPERIMENTS

A random subsample of 200 sockeye salmon smolt will be taken from the fish retained for marking for use in a combined mark retention and delayed mortality experiment. This experiment will be performed in conjunction with every dye test unless otherwise advised by the Project Biologist.

Before marking fish, 100 of the sockeye salmon smolt will be removed from the transport container and placed in one side of a divided instream live box. These fish will be handled the same as the fish that are marked, except they will not be placed in the dye solution. After the marking and recovery period, an additional 100 marked smolt will be placed in the other side of the live box. These smolt will be examined daily for mortalities. The number of mortalities from each group will be recorded on the DELAYED MORTALITY / MARK-RETENTION FORM (Figure 7). These smolt will be released at the beginning of a new mark-recapture test or after five days, whichever is first. The daily smolt catch will not include these fish since they have already been counted.

Additionally, a sample of five marked and five unmarked smolt will be used to conduct daily identification trials. The purpose of this test is <u>not</u> to evaluate field personnel's identification ability, but to evaluate the mark-recapture assumptions. One crewmember will examine the smolt and the other will present the smolt. The duties will switch the next day. The examiner will not look at the smolt before the trial. The presenter will, at random, select a smolt from the live box, present it in a dip net to the examiner for approximately one second, and immediately release the fish back to the appropriate side of the live box. The examiner will determine whether the smolt was marked or not; the presenter will record whether the examiner was correct. The presenter will not inform the examiner of the accuracy of his determinations until all 10 fish have been examined. It is desirable to mimic actual counting conditions as much as possible when conducting these trials; they should be performed under low light conditions. Results of this experiment will be recorded on the DELAYED MORTALITY / MARK-RETENTION FORM (Figure 7). When the experiment is finished, the smolt are counted and released, but not included in the daily smolt catch as they have been previously counted.

PHYSICAL DATA

Air and water temperature, cloud cover, wind direction and velocity, trap rpm, and relative stream height will be measured twice daily (NOON and MIDNIGHT) throughout the season. This information will be recorded on the DAILY PHYSICAL DATA OBSERVATION FORM (Figure 8).

SAFETY

Safety is the highest priority of this project. State safety regulations and Standard Operating Procedures (SOP) will be followed at all times. All staff are personally responsible for assessing unsafe situations and will exercise caution when weighing safety issues. Employees may be subject to disciplinary action without warning, including termination, for noncompliance to State safety regulations.

Employees are expected to review the following SOPs before beginning work:

111-700	Safety Policies and Standards	111-740	Boating Safety
111-710	Office/Warehouse Safety	111-750	Vehicle Safety
111-720	Field Camp Safety	111-760	Laboratory Safety
111-730	Aircraft Safety for Passengers	111-780	Firearm/Bear Safety

In addition, all employees are expected to hold a current American Red Cross First Aid/CPR certification. The department will hold First Aid/CPR classes in Kodiak prior to the field season; if the employee is unable to attend the classes in Kodiak, obtaining the proper instruction will be the employee's responsibility.

A U.S. Coast Guard approved personal flotation device will be worn at all times while boating and while working on the smolt traps. A survival kit including matches, a hand-held VHF radio, a flare gun, a GPS unit, spare motor parts, and a first aid kit will be in the boat at all times.

REPORTING

The crew leader will compile a daily log. This log will be submitted to the Project Biologist at the end of the field season. The crew leader will contact the project biologist daily at 1300 hours by telephone (486-1805) unless otherwise needed or predetermined. The crew leader will record daily smolt emigration counts, water level, water temperature, and trap rpm in the management office every morning by 0730 hours. The crew leader is also responsible for compiling a weekly field report and for co-authoring a season summary. The crew leader is also responsible for completing a comprehensive equipment inventory at the end of the season.

It is desirable for the field crews to photograph all aspects of the fieldwork. Photographs will be taken with a digital camera and downloaded on to the research field computer for editing and storage.

TIMESHEETS

The crew leader is responsible for scheduling daily tasks. Tasks will be scheduled to minimize overtime. Overtime is limited to 30 hours/month (7.5 hours/week) per person, unless otherwise pre-authorized. A proposed work schedule is described in Appendix E1. The crew leader will document, as part of the daily log, all tasks that are performed and the actual hours worked to complete those tasks.

Timesheets will be completed and faxed to Kodiak by the 15th and the last day of each month. If timesheets must be sent in early, amended timesheets can be sent to the Kodiak office if the hours actually worked differ from the hours submitted on the original timesheet. Explicit directions for completing timesheets are located in Appendix F1 and F2.

LITERATURE CITED

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Witteveen, M.W. and J.C. Botz. 2004. Chignik Lakes scale pattern analysis, run apportionment, and sockeye salmon catch sampling results, 2003. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division. Regional Information Report No. 4K04-30. Kodiak.

FIGURES

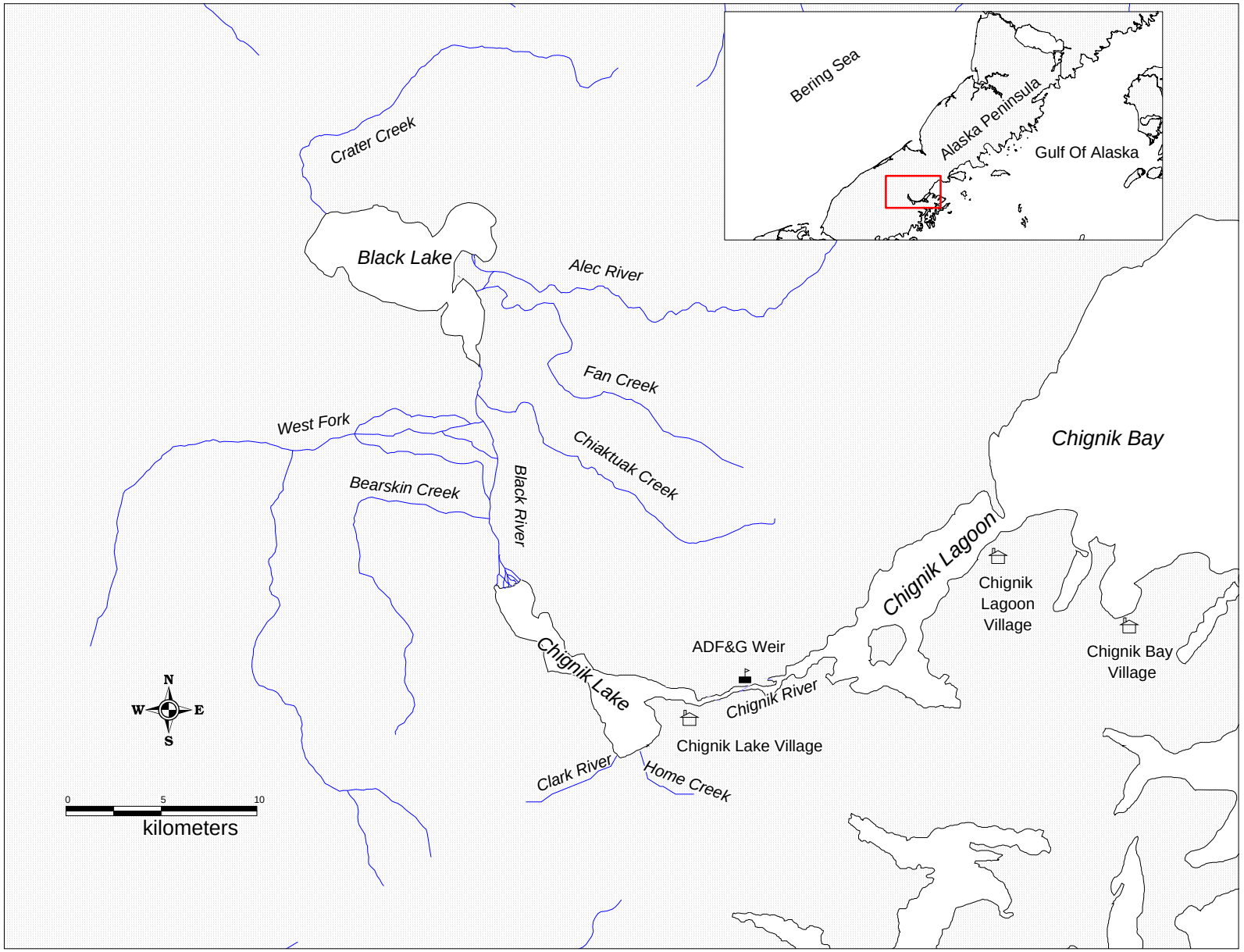

Figure 1.-Map of the Chignik River watershed.

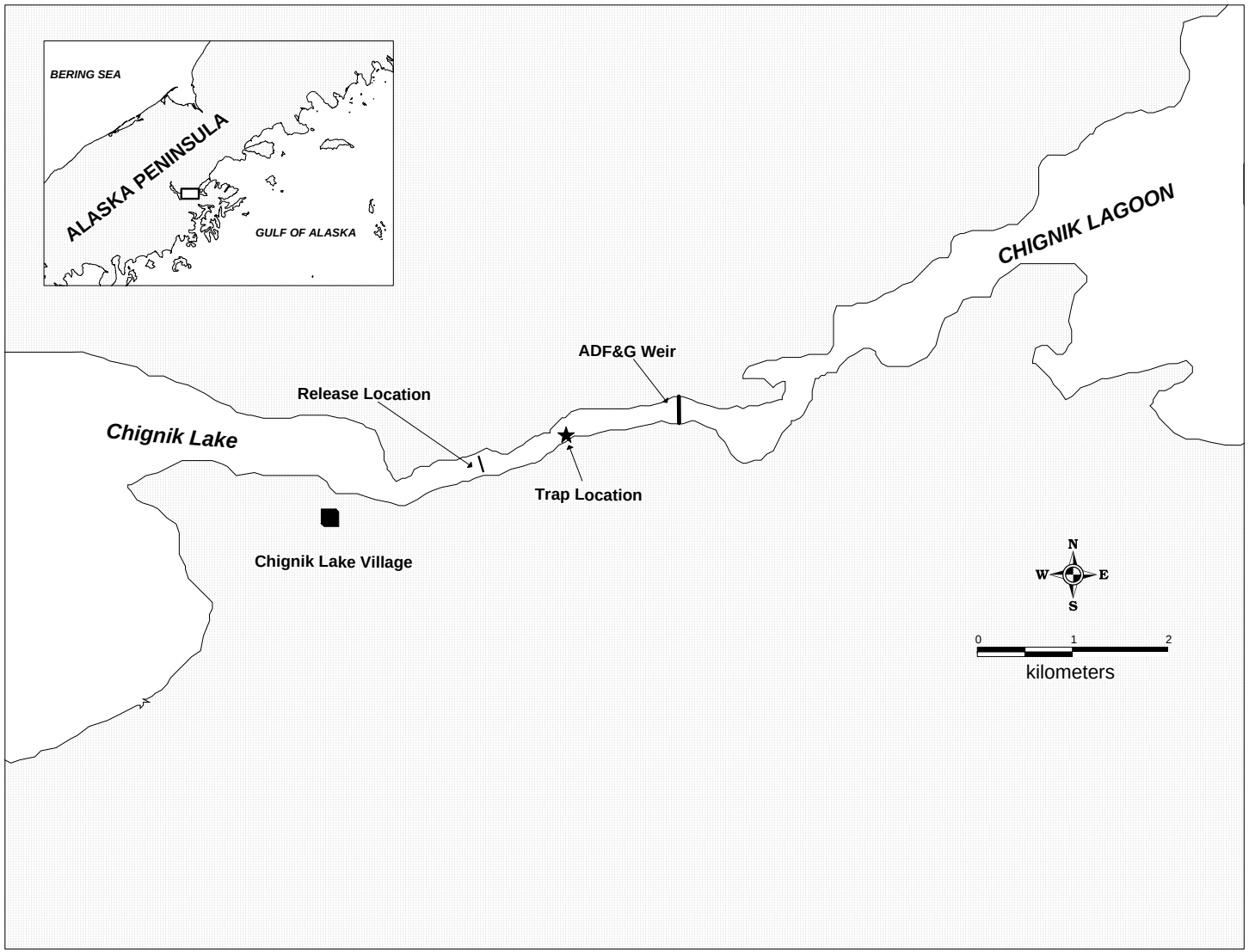

Figure 2.-Location of the traps and release site of marked fish on the Chignik River, Alaska.

Daily Smolt Catch Reporting Form

Trap: _____

Project:_____ Smolt date: _____ Page ____of ____

Time (military)	Sockeye counts					Other counts					Comments[3]
	Catch[1]	Examined for Marks[2]	Marked Recoveries	Trap Mortality	Sockeye Fry	Coho	Dolly V.	Stickleback	Smelt	Sculpin	
Daily Total:											

[1] Catch includes all trap mortalities, but not marked fish.

[2] This number should equal the catch column unless the catch weight method is used or some other circumstance prevents the examination of all captured smolt.

[3] Include weather changes, water level changes, counts of species not included in columns, and any other significant information.

Figure 3.-Daily smolt catch reporting form.

Sockeye Salmon Smolt Reporting Form

Project:_____ Year:_____ Page ____of ____

Smolt Date	Catch (both traps combined)			AWL Sample		Mark-Recapture[2]				Comments
	Daily	Cumulative	Mortalities[1]	Daily	Cumulative	# Released	Daily Recaptures	Cumulative Recaptures	%[3]	

[1] Included in daily count.

[2] Cumulative and % begin over with each release.

[3] Calculated by: % = (cumulative recaptured / #released) * 100

Figure 4.-Sockeye salmon smolt reporting form.

Catch-Weight Worksheet

Smolt Date_____ Page____of ____

Time	Weight	Number of Fish[a] Sockeye	Sockeye Fry	DV	Stick	Coho	Sockeye Recaps[b]
	Total:						

[a] Number of fish in reference sample is from actual counts. Number of fish in subsequent samples is calculated by: $S_c = (S_r * W_s) / W_r$

Where: S_c = Calculated number of fish of each species.

S_r = Number of fish of each species in the reference sample.

W_s = Weight of subsequent sample.

W_r = Weight of reference sample.

[b] Recapture numbers are <u>not</u> included in the number of sockeye column.

Figure 5.-Catch-weight worksheet.

Smolt Dye Release Form

Smolt Day:_____ Grams Dye:_____
Tote Volume:_____

	Time (military)	H_2O Temp.	Comments
Fish into Container			
Begin recovery water exchange			
Addition of dye			
Begin water exchange			
Begin transport			
Release			

Number released:_____

Number held for mark retention experiments:_____

Number of mortalities:_____

Comments (include comments on fish vigor, areas of mortality, how well marked the fish were, etc.):

Personnel:

Figure 6.-Smolt dye release form.

Delayed Mortality/Mark-Retention Form

Date/time fish were marked:_____ Grams dye:_____

Water temp. when fish were marked:_____ Water volume:_____

No. marked fish retained:_____ No. unmarked fish retained:_____

Delayed Mortality

Date	Time	H_2O Temp.	# of mortalities	
			Marked	Unmarked

Mark-Retention

Date	Time	Observer	# Correctly Identified	
			Marked	Unmarked
			5	5
			5	5
			5	5
			5	5
			5	5
			5	5
			5	5

Comments:

Figure 7.-Delayed mortality/mark retention form.

Daily Physical Data Observation Form

PROJECT _____

YEAR _____ LOCATION _____

DATE	TIME	TEMPERATURE (C)		CLOUD	WIND		Trap RPM		GAUGE	COMMENTS (i.e., rain, drizzle, etc...)
		Air	Water	COVER (%)	DIRECTION	VEL (kts)	Small	Large	HEIGHT (cm)	

Figure 8.-Daily physical condition observation form.

APPENDIX A. SMOLT TRAP CONSTRUCTION AND PLACEMENT

Appendix A1.-Smolt trap construction and placement.

The procedures for setting up the Chignik smolt traps are divided into two distinct components, trap installation and weatherport placement. The first priority upon arrival to Chignik is the assembly and installation of the traps. The assembly and installation of the weatherport sampling station is of secondary importance: it can be constructed after the traps are installed and monitoring has been initiated.

SCREW TRAP ASSEMBLY

Three rotary screw traps were stored near the lake outlet at the Fisheries Research Institute camp at the end of the field season. There are two small traps of equal size and one large trap. The two small traps can be easily differentiated. One small trap has a large live box with skimming wheel. The other small trap does not have a skimming wheel and has been modified to be used as a live box. This apparatus has a aluminum plate bolted to the cone entrance. Each trap consists of a rotary screw, two pontoons, a dual beamed live box, a rotary screw support beam with associated plastic bushing, a front structural beam, and a bipod hoisting structure. Each trap and its component parts are stacked together. All hardware including winches, pulleys, pulley harnesses, and bolts are appropriately labeled and located in a large tote in the smolt cave.

The following photographs (Figures 1-6) illustrate the smolt trap components and some of their features.

Figure 1. The photo shows the bow end of two sets of trap pontoons and a single front structural beam. The front beam sleeves, eyes, bipod hoist mounts are also visible from this angle.

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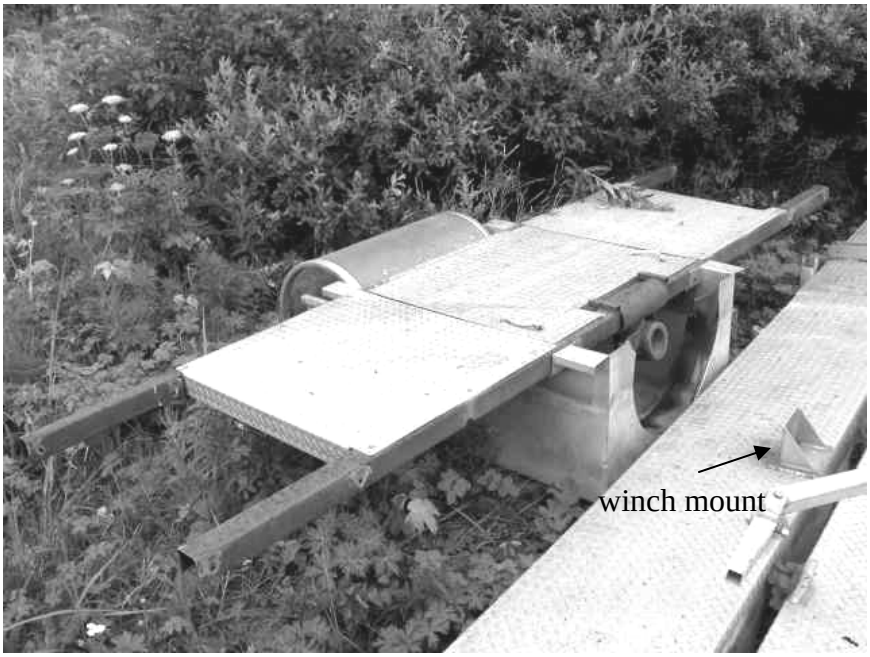

Figure 2. The photo illustrates the dual beamed live box for the large trap. The winch mount on the starboard pontoon is also visible from this angle.

Figure 3. The photo illustrates how the pintle ring fits over a stern beam sleeve. This photo does not show the live box beams inside the sleeve.

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Figure 4. The photo illustrates the large rotary screw drum.

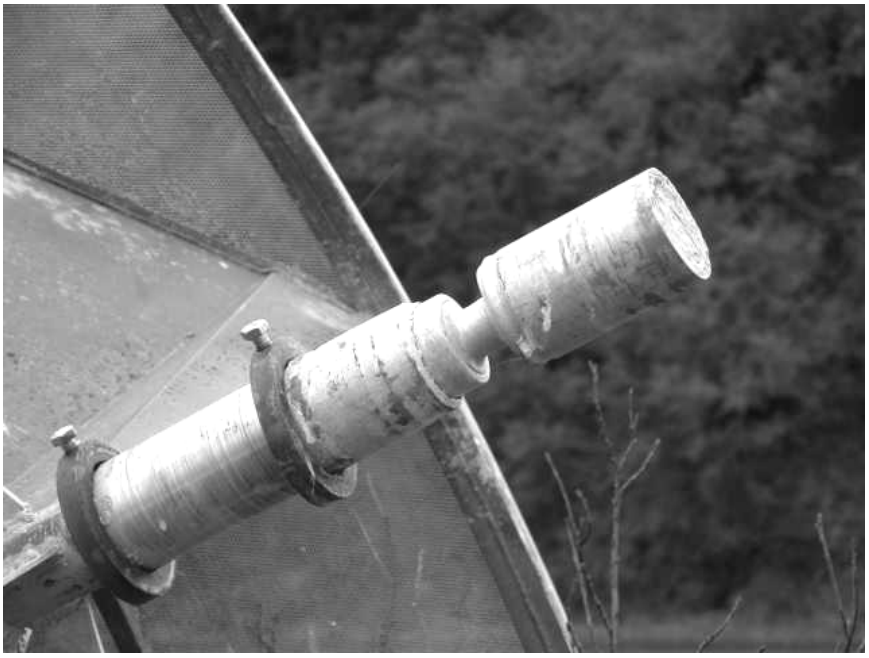

Figure 5. The photo illustrates the trap cone spindle and O-rings. Excessive wear on the spindle occurred due to improper placement of the bipod hoist structure. Care should be taken so that the bipod hoist structure or does not contact the rotating spindle.

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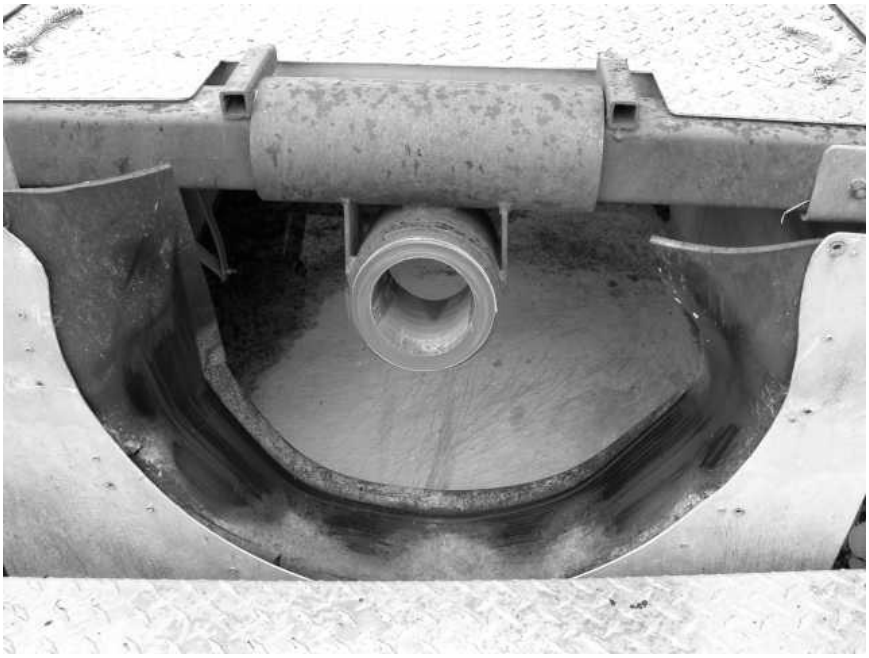

Figure 5. The picture shows the entrance to the live box and the rear spindle mount and plastic bushing.

Figure 6. This photo illustrates the bipod hoist structure with the sliding plastic spindle bushing.

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The first trap to be assembled begins with the small trap that has been modified for use as a live box. The pontoons will be moved down to the beach placing them in the correct orientation with regards to starboard and port labels at the bow end. A 20-25 foot section of crabline will be tied to the eyes at the bow end of each and then a line will be tied from a large willow on the beach to this loop anchoring the apparatus to the shore.

The dual beamed live box will be moved down to the beach. The live box will be bolted to the stern end of the pontoons while it is in the water so that the beams fit correctly in the sleeves. In order to accomplish this, the stern end of both pontoons will be pushed out in the river to get enough clearance to attach the live box. The starboard side will be bolted first. This will take at least two people to manipulate the live box and pontoon to align the bolt holes. The live box will be attached to the port pontoon by sliding a pintle ring sleeve over the front beam and beam sleeve and securing them with bolts long enough to pass through all three components.

The front structural beam will be seated in the beam sleeves and bolted to the starboard pontoon while a pintle ring sleeve will be fastened to the port pontoon. This will complete the assembly of the live box. The screw traps will be constructed in the same fashion, except that they will be fitted with the rotary screw drums.

The live box – pontoon apparatus will be pushed out into the stream so that it is completely afloat, and the rotary screw will be rolled down to the edge of the river and positioned with the cone entrance towards the water. The pontoons will be pulled ashore so that the cone exit falls near the live box opening. The front structural beam will be attached to the pontoons with a ring sleeve. The rotary screw support beam will be affixed to the front spindle of the rotary screw using the O-rings already in place on the spindle. The rear spindle will be attached to the live box end in a similar manner.

The bipod hoist structure will then be bolted to the pontoons. The winch will be bolted to the winch mount on the starboard pontoon. The pulley system will be attached so that the rotary screw can be raised. The first pulley will be attached to the starboard side of the front beam with a chain link. The second pulley will be affixed to the eye in the middle of the front beam with a chain link. The third and final pulley will be bolted to the peak of the bipod hoist structure. The cable will be then threaded through all three pulleys and attached to the rotary screw support beam with the appropriate fastener. The rotary screw will be raised out of the water and an aluminum I-beam will be placed on the pontoons beneath it to act as a chock for transit to the trapping site. The assembly procedures for the large trap will be the same as the small trap

TRAP PLACEMENT

Once the live box and traps are assembled the anchors and lines will be prepared upstream of the trapping site. Two anchor lines are located in a large tote behind the bunkhouse and are labeled for the trap they were used with in the 2003 season. The alders to be used for anchors can be easily identified by the orange flagging. The anchor line labeled for use with the small trap will be tied with a bowline to the flagged alder that is furthest downstream. The line labeled for use with the large trap will be anchored in series to two flagged alders immediately upstream. A bowline will be tied to the lower alder leaving a long tag end so that a second bowline can be tied to the upper alder. A third anchor line will have to be sized and anchored for use with the large trap. The anchor lines will then be uncoiled and the terminal ends brought to the trapping site ready to tie to the traps.

The live box and the legs will be transported to the trapping site first and the live box platform will be anchored to shore by the designated trapping site. The small trap will then be towed to the trapping site. A

-continued-

tow harness equipped with carabiners is located in the same tote as the anchor lines. Using this harness the trap will be clipped to the skiff and untied from the anchor willow. The small trap will be towed downstream to the trapping site. The skiff will be parked immediately upstream of the trapping site and the small trap will be unclipped from the tow harness and clipped to the downstream anchor line via the pulley harness (Figure 7). Now the trap legs will be attached to the port side pintle ring hitches (Figures 8 and 9). The leg supports will be placed on the shore as high as possible while still allowing the legs to extend out far enough in the stream. It might be necessary at this point to gather some large rock to weigh down the trap legs to prevent any large movements. The live box platform can then be attached to the stern of the small trap, anchored to shore, and have its legs secured between the shore and its pontoons.

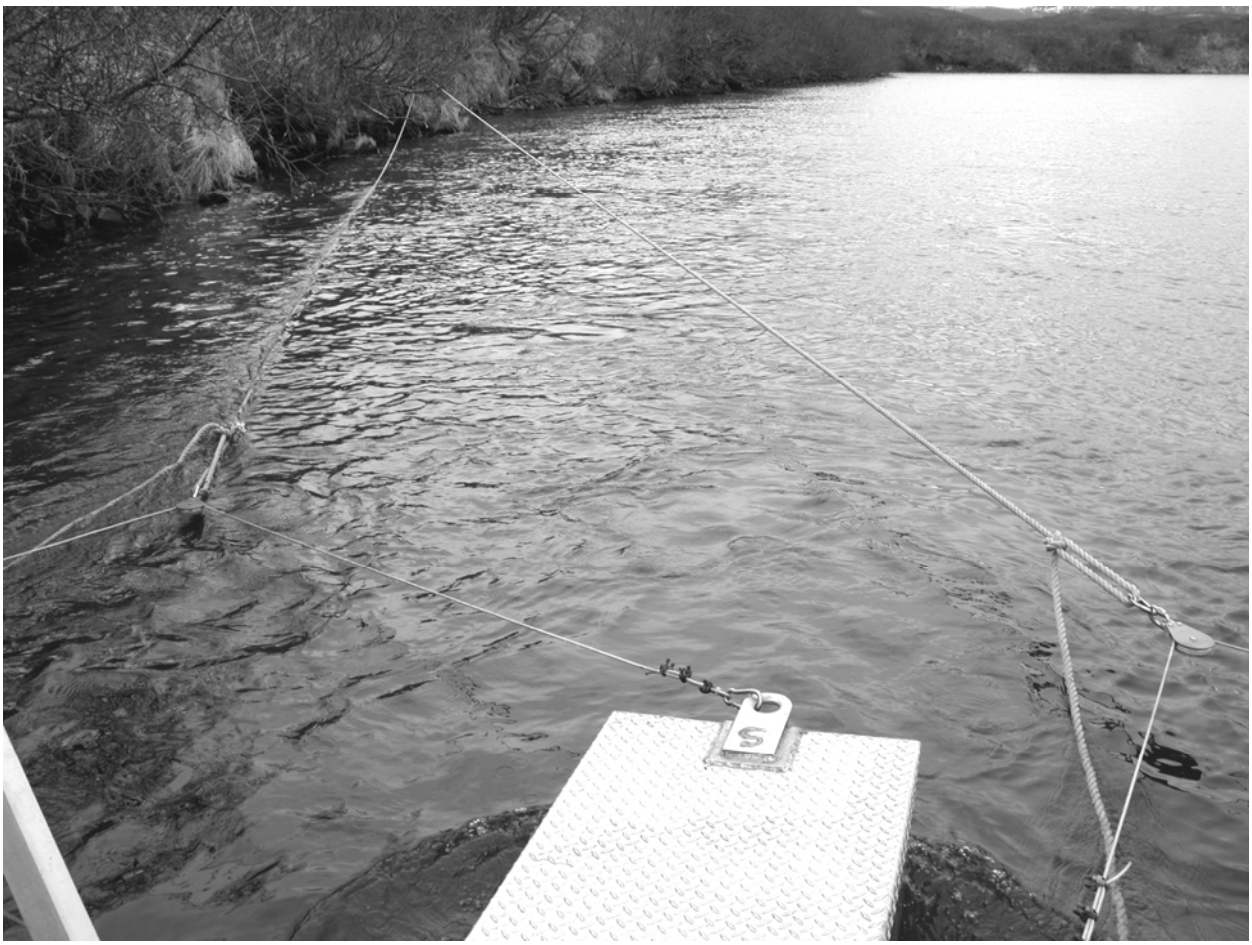

Figure 7. Pulley harnesses attached to anchor lines.

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Figure 8. This photo illustrates the position of the trap legs on shore and how the pontoons of the small trap and live box work area align.

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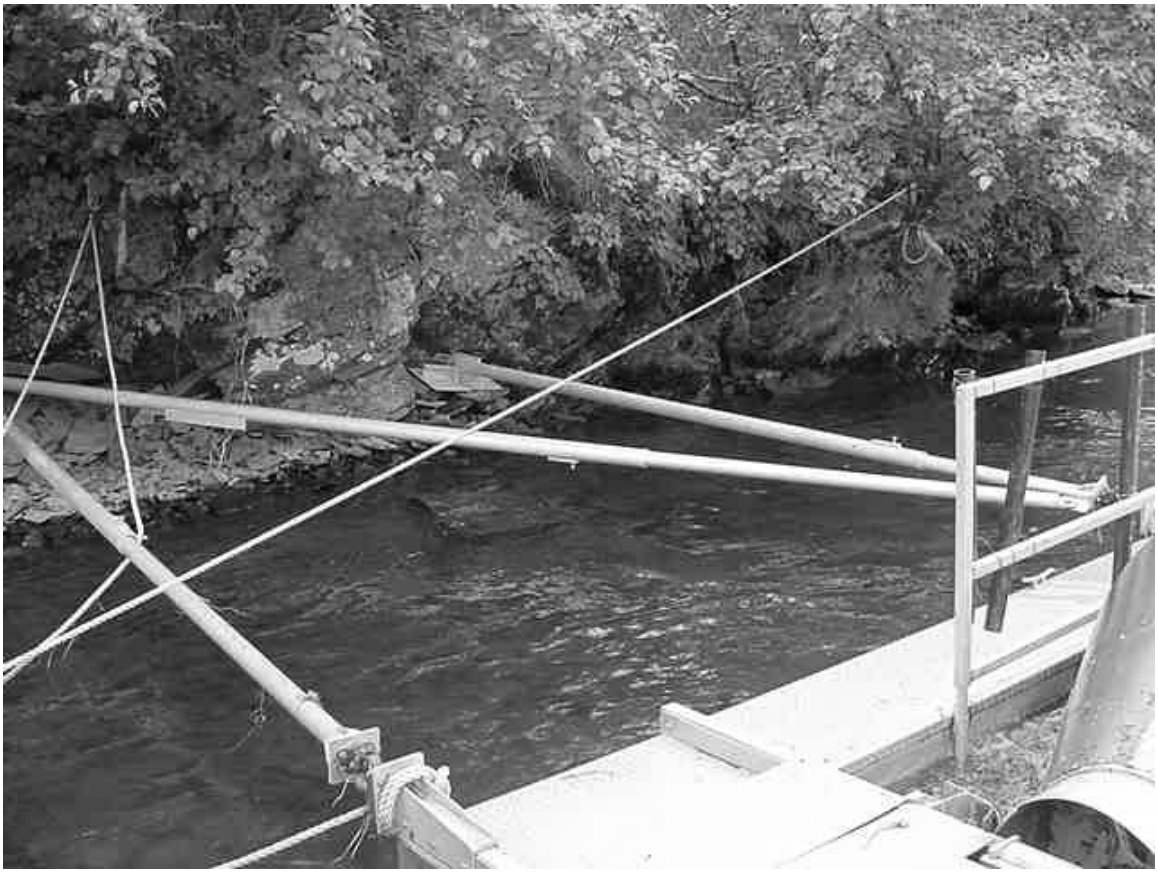

Figure 9. The photo illustrates the trap leg system, anchor lines, and pintle ring sleeves.

After the trap has been pushed out the rotary screw should be lowered and allowed to operate under flow. After testing the trap, some adjustments might be necessary to the trap legs or to the anchor line tie-in point. Upon completion of setting the small trap and legs, the large trap can be placed. The large trap will be towed down well below the small trap in order to turn around and tow it back upstream. At this point one person will ride on the trap while the other person will operate the skiff. The trap will be towed upstream so that it slides slowly up against the side of the small trap and the person riding on the large trap can clip the anchor line into the trap pulley harness. It might take some effort to get the anchor line the right length so that when the rotary screw is lowered into the water the entrance into both rotary screws are in parallel alignment (Figures 10 and 11). This may be accomplished by raising the trap out of the water and using a come-along to winch in the excess anchor line at its point of attachment to shore.

-continued-

Figure 10. The assembled large trap fishing. Note that the bipod hoist is leaning in a direction that will allow the front structural beam to sandwich and apply pressure to the portion of the plastic bushing that extends outside of the metal spindle mount between it and an O-ring. This prevents excessive wear and friction of the spindle against the O-rings.

-continued-

Figure 11. The small trap fishing. Note the position of the plastic bushing.

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FLOATING WEATHER PORT PLATFORM CONSTRUCTION

The floating weatherport platform is composed of the float frame and the weatherport platform (Figure 12). The float frame consists of nine dock floats and three nose cones. All are located behind the bunkhouse. The lumber used to frame the floats is located on the top shelf of the lumber rack in the dive shop. The framing materials include two (2”x 6”x 12’), three (2”x 6”x 14’), and eight (2”x 6”x 2’). All of the dock floats are labeled and will be arranged in order on the bank just upstream of the weir bulkhead. Three dock floats and one nose cone will be connected to make a single modular pontoon. The floats will be connected lengthwise by a 2”x 6” x12’ beam that is bolted to the molded brackets on the floats with carriage bolts.

Figure 12.The photo illustrates the float frame including the construction of the middle pontoon with the 2”x 6”x 2’ connectors. The position of the third float is not aligned flush with the other floats, but spaced several inches.

The nose cone float will also be connected with one 2”x 6”x 2’. The set of floats that make up the middle will be connected by bolting two 2”x 6”x 2’ pieces at each float junction. The three completed modular pontoons will be connected to each other by bolting the three 2”x 6”x 14’ crossbeams to each pontoon.

-continued-

A 6-8 foot section of crabline will be threaded through the eyehole and tied with a double fisherman's knot to form a permanent loop at the front of each nose cone and an anchor line will be threaded through these loops to secure the pontoons to alders on the shore (Figure 13).

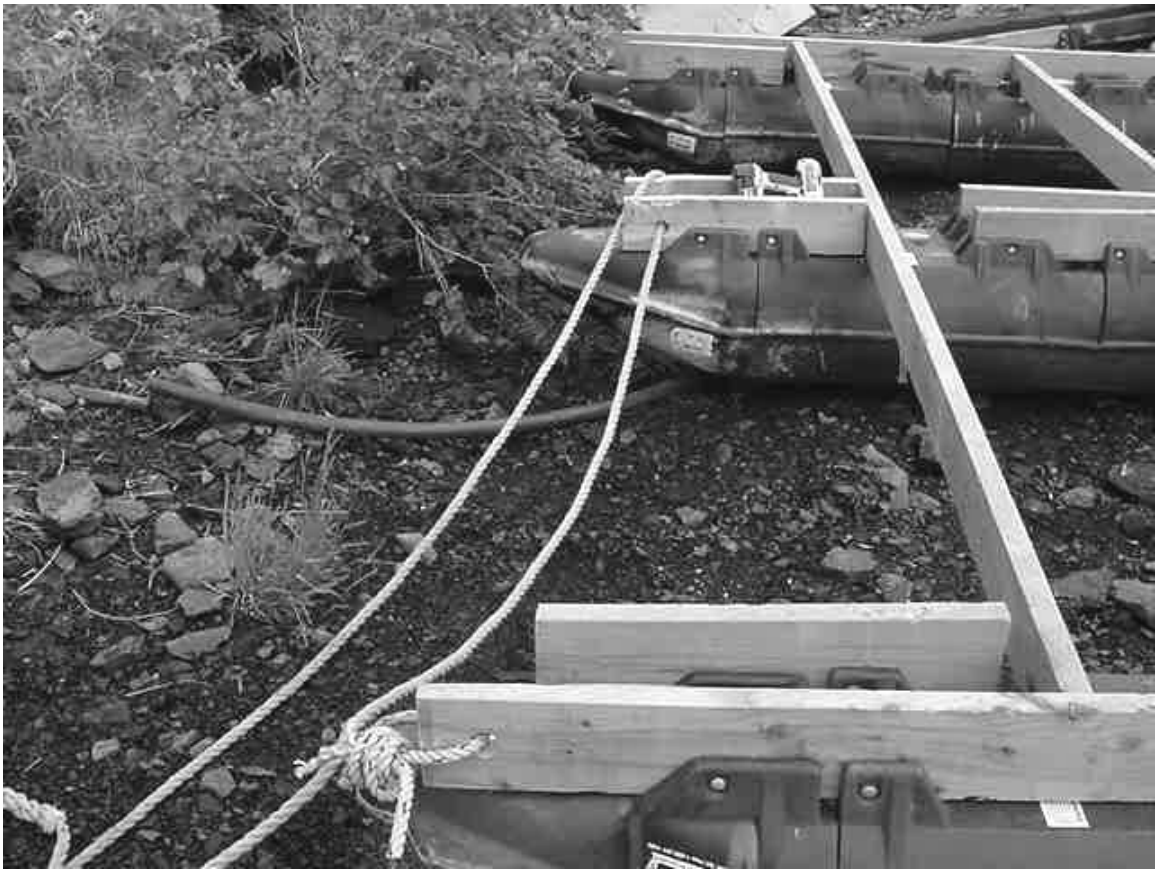

Figure 13. The photo illustrates the nose cones and the permanent loop tied in the frame for anchoring the weather port to the trap. The holes used to connect the gangplank on the middle nose cone are visible from this angle.

THE WEATHERPORT PLATFORM

All lumber for the weatherport platform is located on the top level of the lumber rack in the dive shop. The plywood flooring and framing hardware including the steel leg mounts are located in the smolt cave. Construction of the platform will occur on the floating pontoons while the apparatus is partially afloat. This will allow for an easier launch when pulling the weatherport off the shore with the skiff. The weatherport platform is a simple 10"x 12" floor construction.

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Ten 2”x 6” boards will be used as joists and attached 16” on center to two 2”x 6”x 12” rim joists with 9/16” lag screws. The weatherport platform will then be squared and centered to the floating frame (Figures 14-16). The platform will be secured to the floating frame with joist hangers, and a plywood floor will be screwed to the platform. The steel leg mounts will be attached to the starboard joist with lag screws.

Figure 14. Attachment of 2”x 6” boards to pontoons.

-continued-

Figure 15. Orientation of weatherport floor joists on floating frame.

-continued-

Figure 16. This photo illustrates the weatherport frame construction occurring on the float frame. All the lumber for the frame is labeled.

THE WEATHERPORT

The weatherport tent frame, fabric, door, and poles are located on the top level of the lumber rack. All bolts and pole joints are located in a tote in the smolt cave. The weatherport frame will be arranged and bolted on the platform floor so the door is oriented to the bow end of the floats. A curve tent pole will be inserted onto each post on the frame and connected to the other curved poles with the three way joints. The curved poles which make up the middle hoop will be fitted with the four way joints. After putting the hoops together, the door and rear wall will be attached by hooking the tensioning cord to the cord hooks on the frame. It will be necessary to weight the tensioning cord with one's foot to gain enough force to make the fabric fit snuggly on the poles The three hoops will now be connected to each other at the joints with the straight poles. The top fabric will be pulled and centered over the tent framework. The top fabric will be tensioned over both walls and down to the frame in the same manner as the walls. It will be necessary for one person to stand in the inside of the tent and feed loose fabric to gain maximum tension on the fabric. The flaps at the bottom of the fabric will be stapled to the platform frame to seal the tent from wind.

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Prior to deployment, the weatherport will be loaded with all sampling equipment including cots, chairs, table, and the kerosene heater. The weatherport will be untied from the anchor line and pushed out into the river. It will be walked down to the bulkhead and tied it off to a cleat. The weatherport will then be clipped to the tow harness at the permanent loops on both starboard and port nose cones and towed upstream to the trap. The skiff will be parked and tied off to the large trap. The weatherport will then be pulled upstream by hand behind the live box work area and the tow harness can be unclipped from the skiff and tied off to a cleat on the small trap. A line will be tied to a cleat on the starboard side of the small trap and first fed through the eye on the starboard-side of the weatherport platform. The same line will be fed through the middle and port eyes on the weatherport platform and anchored to shore (Figure 17). The tension on these anchor lines will constantly be affected by changes in streamflow and wind requiring some manipulation over the course of the season. Additionally, a safety line will be tied from the port pontoon nose cone to an upstream alder.

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Figure 17. Position and attachment of the weatherport behind the live box work area.

-continued-

After the traps are properly oriented, a wooden mast will be attached to the handrail on the large trap using zip ties (Figures 18 and 19). This will be used to hold a safety floatation ring, to mount a 12-V work light, and to support the catch-weight apparatus. Photosensitive flashing lights will also be mounted on the bipod hoist structure of each trap to serve as a warning to boat traffic during nighttime hours.

Figure 18. The photo shows the correct orientation of both traps and the weatherport.

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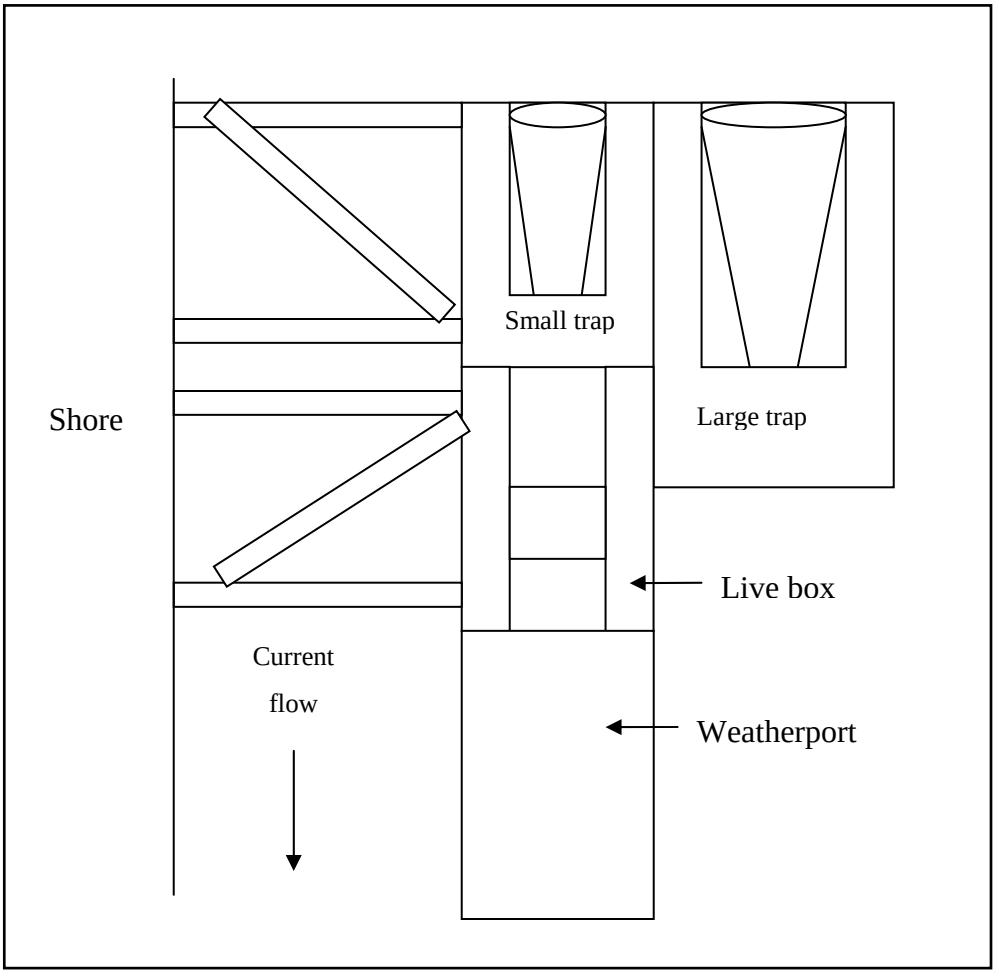

Figure 19. The diagram shows the correct orientation of both traps and the weatherport.

APPENDIX B. JUVENILE SALMON IDENTIFICATION

Appendix B1.-Juvenile salmon identification key.

Key to Field Identification of Anadromous Juvenile Salmonids in the Pacific Northwest

By

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ABSTRACT

A key is presented with descriptive illustrations to help in field identification of live, juvenile salmonids in fresh waters of the Pacific Northwest. Other juvenile fish that may be mistakenly identified as salmonids are included.

INTRODUCTION

Species identification of live, anadromous juvenile salmonids is frequently a problem to the field biologist. The purpose of this key is to list and illustrate the external characteristics which will expedite field identification of juvenile salmonids in the Pacific Northwest.

Five species of Pacific salmon (pink, chum, sockeye, chinook, and coho); four species of trout (cutthroat, brown, Dolly Varden, and rainbow or steelhead); and other juvenile and adult fish [1] that may be mistaken for salmon or trout in fresh water are described in this key.

USE OF KEY

The characteristics for identification are listed in a series of alternative statements, some of which are illustrated. To use the key, examine the first statement; if applicable, proceed to the next and continue to successive statements until the species is identified. If a statement is not applicable, pass to the alternative characteristics indicated by numbers in parentheses (numbers on the drawings correspond to numbers of statements in the key). Continue in this manner until the specimen is identified. Some external characteristics are positive separating features (marked with asterisk), whereas others are not. Therefore, two or more statements should be considered before final rejection. If a precise identification cannot be made using the external characteristics —and the fish can be sacrificed, a positive identification can usually be made from internal features (marked with double asterisks). A bibliography of keys that utilize more descriptive internal characteristics is included in this paper.

[1] Especially adult smelt, family Osmeridae.

KEY

1. (47) Adipose fin and scales present. (Fig. 1)
2. (48) Fleshy appendage at base of pelvic fins present.
3. (49) Mouth large, reaching at least to center of eye.

Family Salmonidae

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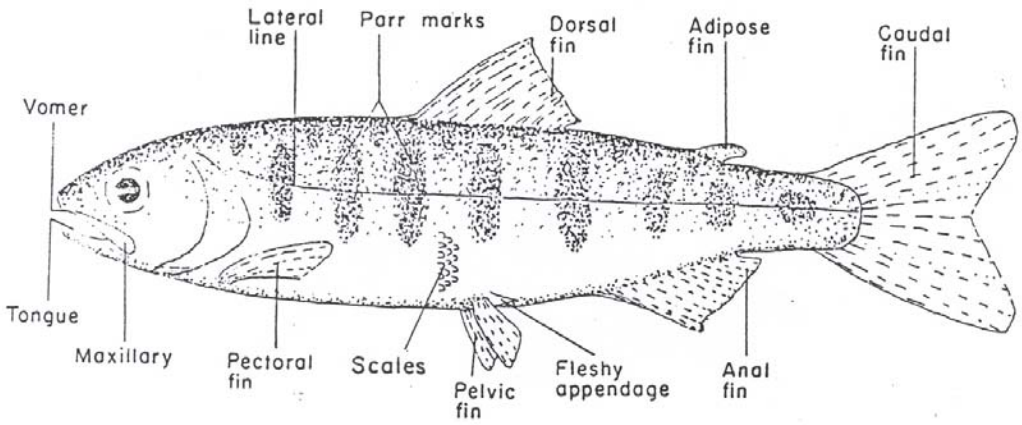

Figure 1.—A hypothetical salmonid showing external characteristics.

4. (17) Anal fin higher than long, with 8 to 12 developed rays (Fig. 2A)
5. (52) *Teeth on head and shaft of vomer. (Fig. 3A)

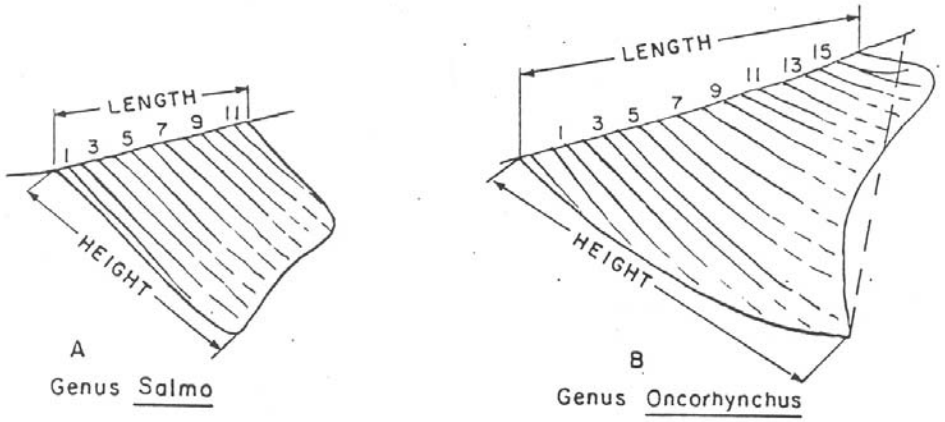

Figure 2.—Anal fins: (A) Trout, genus *Salmo;* (B) Pacific salmon, genus *Oncorhynchus.* The two drawings show differences in structure and fin ray count. (Note that the length of the anal fin is its overall basal length, and its height is that distance from the origin of the fin to the tip of the anterior lobe. In counting fin rays, include only those which originate from the base and terminate at the outer margin of the fin or are half as long as [or greater than] the longest ray.)

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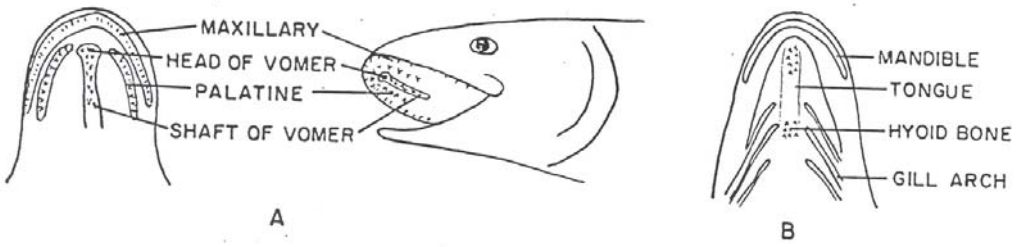
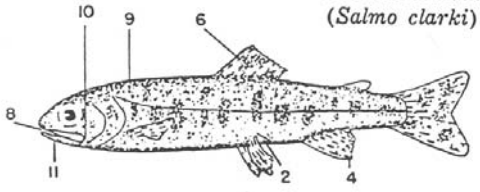


Figure 3.—Location of dentition in (A) the roof and (B) the floor of the mouth of salmonid fishes. (Presence or absence of teeth on the vomer or tongue may be determined by use of the little finger or a blunt instrument. The small hyoid teeth at the base of the tongue are located between the gill arches of the lower jaw and are difficult to find.)

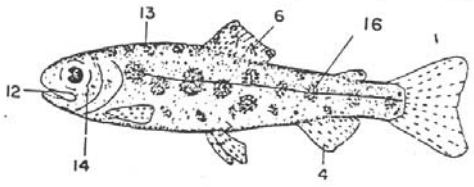
6. (18) Dorsal fin with large dark spots.
Trout
Genus *Salmo*

7. (53) Adipose fin not orange; no row of pale round spots along lateral line.
8. (12) *Small hyoid teeth at base of tongue. (Fig. 3B)
9. (13) Not more than five parr marks on mid-dorsal ahead of dorsal fin.
10. (14) Maxillary reaching past posterior margin of eye.
11. (15) Red or yellowish hyoid mark under lower jaw. Tail usually black spotted.
Cutthroat trout
(*Salmo clarki*)



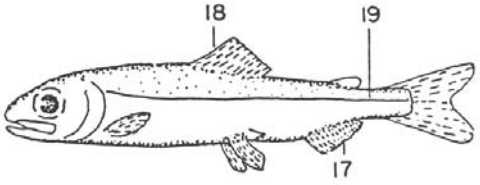
12. (8) *No teeth at base of tongue.
13. (9) Five to 10 parr marks along mid-dorsal ridge ahead of dorsal fin.
14. (10) Maxillary short, not reaching past posterior margin of eye.
15. (11) No hyoid mark under lower jaw. Few or no spots on tail.

16. (20) Parr marks almost round.
Rainbow or
steelhead trout
(*Salmo gairdneri*)



17. (4) Anal fin longer than high, with 13 or more developed rays. (Fig. 2B)
18. (6) Dorsal fin without large dark spots, may be black tipped.
Pacific salmon
Genus *Oncorhynchus*

19. (20) No parr marks. Fry leave fresh water while small—approximately 1.75 inches (45 mm) long.
Pink salmon
(*O. gorbuscha*)



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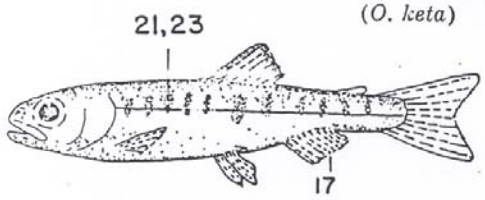
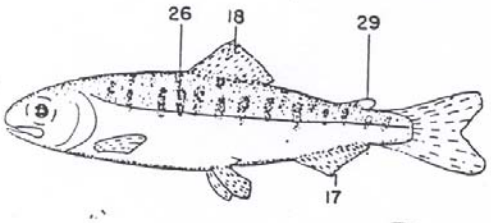
20. (16) Parr marks present as vertical bars or oval spots.
21. (30) Parr marks short, extending little, if any, below lateral line.
22. (25) Gill rakers on first arch, 19 to 26. ** Pyloric caeca, 140 to 186.
23. (26) Parr marks faint. Sides below lateral line iridescent green.
24. (27) Small when migrating from fresh water, approximately 1.5 inches (40 mm) long.

Chum salmon
(*O. keta*)



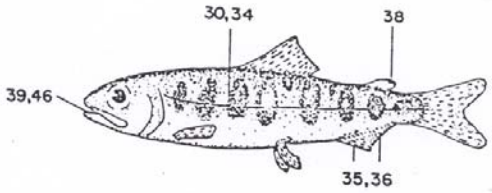
25. (22) Gill rakers on first arch, 30 to 40. **Pyloric caeca 60 to 115.
26. (23) Parr marks usually sharply defined. Sides below lateral line silvery, not iridescent green.
27. (24) Relatively large when migrating from fresh water, approximately 3 to 5 inches (80 to 126 mm) long.
28. (31) Gill rakers long and slender, more than 29 on first arch.
29. (32) Adipose fin clear, not pigmented.

Sockeye salmon
(*O. nerka*)



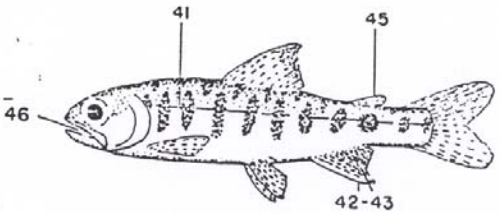
30. (21) Parr marks large, vertical bars centered by lateral line.
31. (28) **Gill rakers short and thick, fewer than 29 on first arch.
32. (29) Adipose fin at least partially pigmented.
33. (40) **Pyloric caeca more than 90.
34. (41) Parr marks broader than interspaces.
35. (42) Anterior rays of anal fin not distinctly longer than rest, not white edged.
36. (43) Anal fin not pigmented.
37. (44) Black spots, when present, on both lobes of caudal fin.
38. (45) Adipose fin not completely mottled, clear area at anterior base of fin.
39. (46) Black gums along base of lower teeth.

Chinook salmon
(*O. tshawytscha*)



40. (33) **Pyloric caeca less than 80.
41. (34) Parr marks narrower than interspaces.
42. (35) Anterior rays of anal fin elongated; when depressed they extend to base of last ray. (Fig. 2B)
43. (36) Anal fin pigmented between rays, resulting in black banding.
44. (37) Black spots, when present, on upper lobe of caudal.
45. (38) Adipose fin completely pigmented.
46. (36) Mouth gray to white.

Coho salmon
(*O. kisutch*)



-continued-

47. (1) Adipose fin not present; scales present or lacking.

Not Salmonidae

48. (2) No fleshy appendage at base of pelvic fins.

Smelts
Family Osmeridae

49. (3) Mouth small, not reaching center of eye; teeth weak or absent.

50. (51) Depressed dorsal fin, shorter than head.

Whitefishes
Genus *Coregonus*

51. (50) Depressed dorsal fin, longer than head.

Arctic grayling
(*Thymallus arcticus*)

52. (5) **Teeth on head of vomer only.

Chars
Genus *Salvelinus*
Dolly Varden (*S. malma*)

53. (7) Adipose fin orange; row of distinct pale round spots along lateral line.

Brown trout
(*Salmo trutta*)

ACKNOWLEDGMENTS

We especially thank Dr. Arthur D. Welander, Professor of Fisheries, and Dr. Bruce S. Miller, Research Biologist, College of Fisheries, University of Washington, Seattle, for their valuable suggestions. We also thank Galen H. Maxfield, Fishery Biologist, and Dr. Alan J. Beardsley, Fishery Biologist, both from the NMFS Northwest Fisheries Center, Seattle.

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Appendix B2.-Photos of fishes present in the Chignik watershed.

Figure 1. Juvenile Sockeye salmon.

Figure 2. Juvenile coho salmon.

-continued-

Figure 3. Stickleback.

Figure 4. Dolly Varden.

-continued-

Figure 5. Pygmy whitefish.

Figure 6. Coast range sculpin.

APPENDIX C. SMOLT AGE-WEIGHT-LENGTH (AWL) SAMPLING MATERIALS AND METHODS

Appendix C1.-Smolt age-weight-length (AWL) sampling materials and methods.

Annually, outmigrating salmon smolt are sampled for age (scales), weight, and length, by field crews throughout the Westward Region. These data are essential for sound management of the State's salmon resources.

To be useful, data must be recorded on the age, weight, length (AWL) optical scanning (opscan) forms neatly and accurately. In addition, scale samples must be collected and mounted properly to ensure accurate age determination. The following procedures are to be strictly adhered to when sampling juvenile salmon for age, weight, and length.

Complete each section on the left side of the AWL form using a No. 2 pencil and darken the corresponding circles as shown in the figures. Make every effort to darken the entire circle as the optical scanner, which reads and records the data from the AWL forms, may not recognize partially filled circles. Be sure to transfer the litho code, located in the left margin on the front side of the AWL form to the back side of the form by darkening the appropriate circles (see Appendix B3.).

Label only one form at a time to avoid a "carbon paper effect" resulting in stray marks. Special care should be used to ensure that stray marks do not occur on either side of the AWL form. Stray marks and scuffed AWL forms can severely hamper scanning. The AWL forms should be treated carefully; the scanner in the Kodiak office cannot read damaged forms. The forms should not be stapled, bent, paper-clipped or folded. Specific instructions for completing AWL forms are listed in Appendix B2 and an example of an AWL form filled out for smolt sampled can be found in Appendix B3.

All juvenile salmon AWL data will be recorded in a field notebook dedicated to smolt sampling. These data will then be transferred from the field notebook to the AWL forms. Each species will have its own AWL sample number series that runs sequentially throughout the season. Up to 40 individual fish per smolt day may be included in one AWL sample. If more than 40 fish are sampled in a single smolt day, then multiple AWL numbers will be used on that day. For example, if 70 sockeye salmon smolt are sampled in a single day (day 1), the AWL numbers will be AWL #001 (fish 1-40; 8 slides) and AWL #002 (fish 1-30; 6 slides). The next day will start with AWL #003. Each day's sample will start with a new AWL number.

Smolt will be sampled as soon as possible after they are captured. The smolt will be transported in clean, 5-gallon gallon buckets to the sampling area. An additional bucket of water will be used as a recovery bucket. Buckets containing smolt will be filled with fresh, clean water and aerated. The buckets will be covered when possible to avoid stress on the fish.

Tricane Methanesulfate (MS-222) will be used to anesthetize the smolt; latex gloves will be worn to prevent direct exposure to the anesthetic. The this chemical will be administered by experienced personnel. A small amount (approximately 1 g) of MS-222 and a small amount of baking soda will be dissolved in approximately 2 L of cold water. The amount of anesthetic used will vary depending on the water temperature, freshness of the chemical, and size of the smolt. A few smolt will be placed in the anesthetic solution until subdued to a point where they can no longer flex their axial musculature but can still ventilate their gills. The concentration of the solution should be such that it immobilizes the fish in 2-3 minutes. After the fish are anesthetized, it is important to sample them quickly and place them in a recovery container to prevent mortality. No more than 80 smolt will be anesthetized with one batch of solution.

After the smolts have been immobilized, excess water will be gently removed from the fish using a paper towel or a wet sponge as a blotter. Place the fish on its right side to sample the left side. Measure smolt length, to the nearest mm, from tip-of-snout to tail fork (Appendix B4). Record length by blackening the appropriate column circles on the front side of the AWL form. When collecting length data, take care to ensure that each length corresponds to the appropriate scale smear mounted on the slide, as length-at-age is evaluated for each sample. Weigh each smolt to the nearest 0.1 g, and record the weight by blackening the appropriate column circles on the back side of the AWL form.

On salmon species, the preferred scale is located where a straight line between the posterior insertion of the dorsal fin and the anterior insertion of the anal fin crosses the second scale row dorsal to the lateral line. In smolt, the area directly around this scale is considered the preferred area (Appendix B4). If scales are not present in this area then scales should be taken from the secondary location, which is the same area on the right side of the fish. A scalpel will be used to remove 5-10 scales from the preferred area. These scales will be mounted on a glass slide using a

-continued-

will be used to remove 5-10 scales from the preferred area. These scales will be mounted on a glass slide using a probe to position the scales. Scales from five fish will be mounted on each slide. The scalpel will be wiped clean of scales and slime between each fish. A diagram of a slide with scales mounted correctly is located in Appendix B5.

The left portion of each slide will be labeled with AWL number, sample location, species, date, and inclusive fish numbers. A diagram of a properly labeled slide is located in Appendix B5. After sampling, fish will be held in a recovery container until they are swimming normally and then released downstream of the trapping location. When the slides are completed, return them to the box in order by AWL # and fish #. Label the slide box on top with the information listed in Appendix B5.

Appendix C2.-Procedure for recording salmon smolt age-weight-length data on AWL forms.

Smolt length and weight will be recorded on AWL forms (Appendix B4.). Using a No. 2 pencil, complete each section of the left side of the AWL and darken the corresponding blocks.

Fill out each of the following:

Description

Record the following: species, location, year and samplers names (e.g., sockeye smolt, Frazer fish pass, 2003, Sagalkin, Schrof).

Card

The AWL forms and corresponding slides are numbered sequentially by date throughout the season starting with 001. A new, consecutively numbered AWL form is used each day even if the previous AWL form is not full. There may be a minimum of one fish and a maximum of 40 fish (8 slides) per AWL form.

Species

Refer to the reverse side of the AWL form for the correct one digit code (e.g., sockeye = 2).

Day, Month, Year

Use appropriate digits for the date the fish are sampled.

District

List the district in which the fish were sampled. For the Chignik watershed, the district is 271.

Subdistrict (Section)

List the subdistrict in which the fish were sampled. For the Chignik watershed, the subdistrict is 10.

Stream

List the stream in which the fish were sampled. For the Chignik watershed, the stream is 310.

Location

The Chignik River smolt trap is 235.

Period

List the period (sample week) in which the fish were sampled (Appendix B6.).

Project and Gear

Refer to the reverse side of the AWL form for the correct code. Smolt samples collected the traps will have a project code of 8 and a gear code of 00.

Mesh

Leave blank unless specifically instructed by supervisor to do otherwise.

Type of length measurement

Refer to the reverse side of the AWL form for the correct code (e.g., tip of snout to tail fork = 2). Refer to Appendix B1.

-continued-

Number of scales per fish

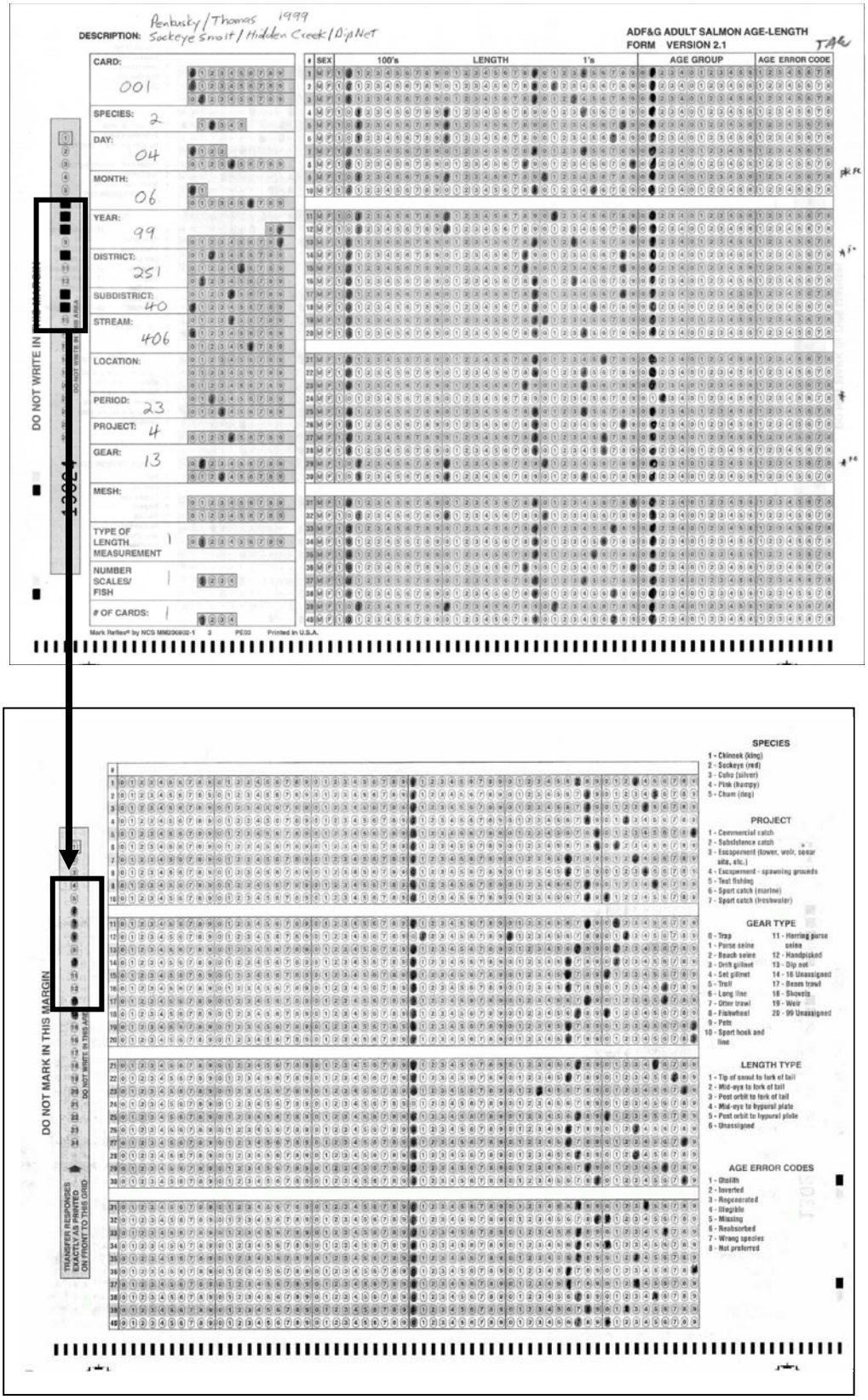
Fill in the number of scales (smears) collected per fish. For smolt, one scale smear per fish is collected.

# of cards

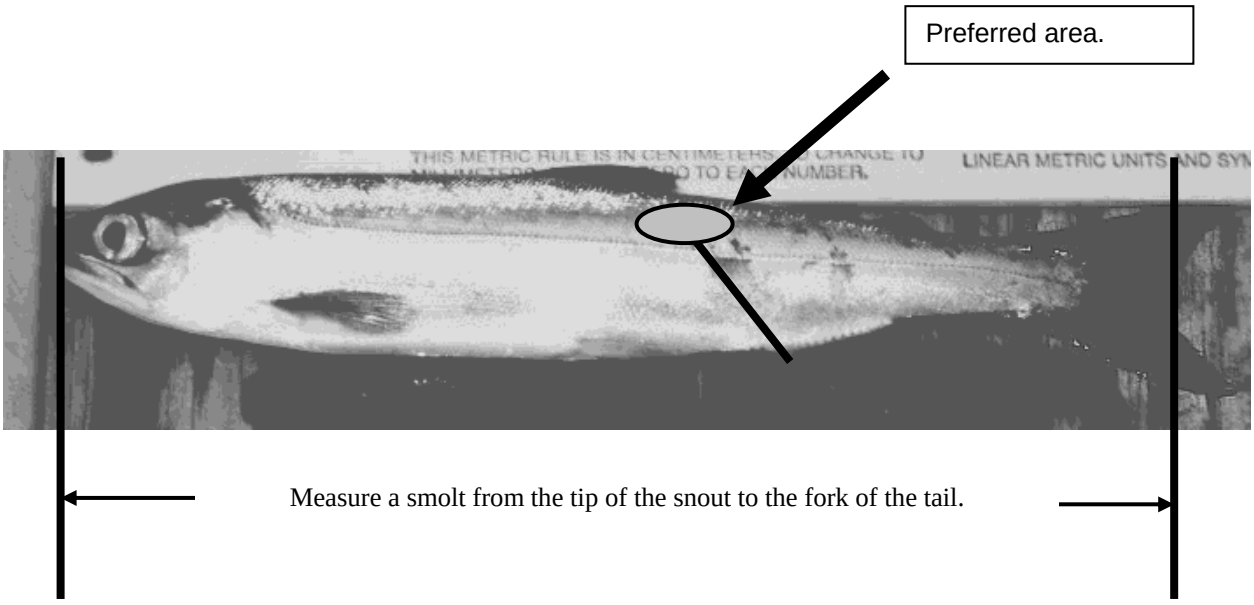
# of cards always = 1 (each AWL form is individually numbered).

If possible, keep the AWL forms in numerical order throughout the season and keep all forms flat, dry, and clean. Remember, when sampling smolt, weight data is recorded on the back side of the AWL form and the litho code, located in the left margin on the front side of the AWL form must be transferred to the back side of the form (see Appendix B3). The litho code is the number unique to each AWL form and copying the litho code from the front to the back of the form indicates weight data was transcribed on the back of the form for the Optical scanning machine to read. Fish slime and water curling may cause data to be misinterpreted by the optical scanning machine. **It is the responsibility of the crew leader to make sure that all forms are carefully edited before returning them to their supervisor.**

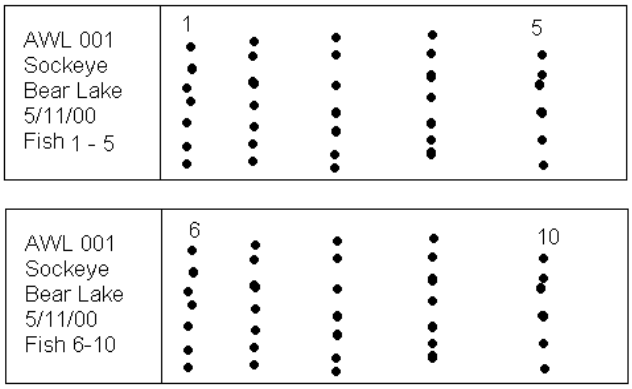
Appendix C3.-Example of an AWL form filled out for smolt sampled.



Appendix C4.-Photo of a smolt with the preferred area indicated.



Appendix C5.-An example of two correctly labeled smolt slides.



This represents fish 1 through 10 from a sample collected on 5/11/00.

It is recommended to number above every row of scales on the slide.

When the slides are completed, return them to the box in order by AWL # and fish #, and label the slide box on top with the following information:

Location: Bear Lake

AWL Number: AWL 001

Beginning and end dates: 5/11-7/13/00

Sockeye Salmon Smolt

Appendix C6.-Sampling weeks and associated calendar dates, 2007.

Week	Calendar Dates	Week	Calendar Dates
1	01-Jan to 03-Jan	28	05-Jul to 11-Jul
2	04-Jan to 10-Jan	29	12-Jul to 18-Jul
3	11-Jan to 17-Jan	30	19-Jul to 25-Jul
4	18-Jan to 24-Jan	31	26-Jul to 01-Aug
5	25-Jan to 31-Jan	32	02-Aug to 08-Aug
6	01-Feb to 07-Feb	33	09-Aug to 15-Aug
7	08-Feb to 14-Feb	34	16-Aug to 22-Aug
8	15-Feb to 21-Feb	35	23-Aug to 29-Aug
9	22-Feb to 28-Feb	36	30-Aug to 05-Sep
10	01-Mar to 07-Mar	37	06-Sep to 12-Sep
11	08-Mar to 14-Mar	38	13-Sep to 19-Sep
12	15-Mar to 21-Mar	39	20-Sep to 26-Sep
13	22-Mar to 28-Mar	40	27-Sep to 03-Oct
14	29-Mar to 04-Apr	41	04-Oct to 10-Oct
15	05-Apr to 11-Apr	42	11-Oct to 17-Oct
16	12-Apr to 18-Apr	43	18-Oct to 24-Oct
17	19-Apr to 25-Apr	44	25-Oct to 31-Oct
18	26-Apr to 02-May	45	01-Nov to 07-Nov
19	03-May to 09-May	46	08-Nov to 14-Nov
20	10-May to 16-May	47	15-Nov to 21-Nov
21	17-May to 23-May	48	22-Nov to 28-Nov
22	24-May to 30-May	49	29-Nov to 05-Dec
23	31-May to 06-Jun	50	06-Dec to 12-Dec
24	07-Jun to 13-Jun	51	13-Dec to 19-Dec
25	14-Jun to 20-Jun	52	20-Dec to 26-Dec
26	21-Jun to 27-Jun	53	27-Dec to 31-Dec
27	28-Jun to 04-Jul		

APPENDIX D. FINFISH TISSUE SAMPLING OF SMOLT FOR DNA ANALYSIS

Appendix D1.- Finfish tissue sampling of smolt for DNA analysis.

ADF&G Gene Conservation Lab, Anchorage

I. GENERAL INFORMATION

We use fin clip samples from individual fish to determine the genetic characteristics and profile of a particular run or stock of fish. This is a non-lethal method of collecting tissue samples from smolt size fish for genetic analysis. The most important thing to remember in collecting samples is that **only quality tissue samples give quality results**. If sampling from recently moribund smolt: tissues need to be as "fresh" and as cold as possible, do not sample from fungal fins.

SAMPLE PRESERVATIVE: ETHANOL (ETOH) PRESERVES TISSUES FOR LATER DNA EXTRACTION WITHOUT HAVING TO STORE FROZEN TISSUES. AVOID EXTENDED CONTACT WITH SKIN.

II. SAMPLE PROCEDURE:

1. Tissue type: Fin clip tissue types will be determined and collected based on smolt(s) overall size. **NO adipose fin.**
   - **a.** **Non-lethal** sampling: pelvic fin clip samples will be taken from smolt (> 100mm) in size. ***Only one pelvic fin clip per fish per vial.***
   - b. **Lethal** sampling: two size categories (65-100mm) and/or (< 65mm) in size to provide ample tissue/ethanol ratio for quality tissue preservation. Clip ½ caudal fin clip per smolt (65-100mm) or clip the entire caudal fin from smolt (< 65mm) in size as shown in diagram provided.

2. Select smolt randomly, without regard to size or position in the rotary fish trap.

3. Prior to sampling, fill the vials half way with ETOH from the squirt bottle. Fill only the vials that you will use for a particular sampling period.

4. To avoid any excess water or fish slime in the vial, wipe the selected fin dry prior to sampling. Using the dog toe nail clipper or scissors, make the fin clip off (**1/2 -1" max**) to fit into the cryovial.

5. Place fin clip into ETOH. The tissue/ethanol ratio should be **slightly less than 1:3** to thoroughly soak the tissue in the buffer.

6. Top up vials with ETOH and screw cap on securely. Invert tube twice to mix ETOH and tissue. Periodically, wipe the dog toe nail clippers or scissor blade so not to cross contaminate samples.

7. Data to record: Record each vial number so individual tissue samples correlate with additional data being collected.

8. Discard or store remaining ethanol from the 500ml bottle before returning samples. **Tissue samples must remain in 2ml ethanol** after sampling. HAZ-MAT paperwork will be required for return shipment. Store vials containing tissues at cool or room temperature, away from heat in the white sample boxes provided. In the field: keep samples out of direct sun, rain and store capped vials in a dry, cool location. Freezing not required.

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Supplies included with sampling kit:

1. (1) Nail clipper - used for cutting the fin clip
2. Cryovials - small (2ml) plastic vials; pre-labeled.
3. Caps – with or without gasket to prevent evaporation of ETOH.
4. Cryovial rack- white plastic rack with holes for holding cryovials while sampling
5. Ethanol (ETOH) – in bulk Nalge bottle
6. Squirt bottle – to fill or "top off" each cryovial with ETOH. Squirt bottle not for ethanol storage.
7. Printout of sampling instructions
8. Laminated "return address" label

III. SHIPPING: HAZMAT PAPERWORK IS REQUIRED FOR RETURN SHIPMENT OF THESE SAMPLES AND IS INCLUDED IN THE KIT.

Return shipping code: **11340643-11340643**

Smolt Stage

Ship samples to:

ADF&G – Genetics
333 Raspberry Road
Anchorage, Alaska 99518

Lab staff: 1-907-267-2247
Judy Berger: 1-907-267-2175
Chris Habicht: 1-907-267-2169

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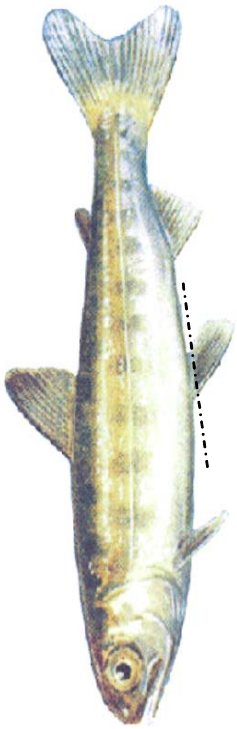
ADF&G Gene Conservation Laboratory, Anchorage

Non-lethal finfish tissue sampling of sockeye salmon smolt



(>100mm)

Lethal finfish tissue sampling of sockeye salmon smolt

(65-100mm)

(< 65mm)

Smolt Stage

Non-lethal sampling: one category **(> 100mm)**. Clip off only **one pelvic** and put fin clip into pre-filled ETOH cryovial (shown above). **Only one fin clip per fish per vial.**

Lethal sampling: two size catagories **(65-100mm)** and/or **(< 65mm)**. Clip off ½ caudal fin or the entire caudal fin (shown above) necessary to maintain 1:3 tissue/ethanol ratio for tissue quality.

Select sockeye smolts for tissue sampling randomly, without regard to size or position in rotary screw fish traps. **NO** adipose fin ("fatty tissue").

APPENDIX E. PROPOSED CREW WORK SCHEDULE

Appendix E 1. Proposed crew work schedule for the Chignik Smolt Enumeration Project.

Employee	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
FB I	0000-0400 1200-1300 2130 - 2359 **7.5**	0000-0530 1200-1400 **7.5**	0000-0530 1200-1400 **7.5**	0000-0530 1200-1400 **7.5**	0000-0530 1200-1400 **7.5**	1200-1300 1800-1900 **RDO** **2**	0000-0530 **RDO** **5.5**
FWT II	0000-0400 1700-1800 2130 - 2359 **7.5**	0000-0530 1600-1800 **7.5**	0000-0530 1600-1800 **7.5**	0000-0530 1600-1800 **7.5**	0000-0530 1600-1800 **7.5**	0000-0530 **RDO** **5.5**	1200-1300 1800-1900 **RDO** **2**
Activities	Dye Test Sample	Sample	Sample	Sample	Sample		

APPENDIX F. TIMESHEET INSTRUCTIONS

Appendix F 1.-Instructions for filling out a timesheet.

All ADF&G employees must fill out a time sheet biweekly and these timesheets must be turned in to the Administrative staff in Kodiak in a timely manner. Please follow these instructions when filling out your time sheets to avoid payroll problems. When a flight comes out to drop off groceries, or for any other reason, near the end of a pay period, camp personnel need to send in their timesheets. Fill in the time sheet up to the day you send them in and attempt to project your remaining hours worked.

Fill out each of the following on the top of the timesheet:

Pay period: pay periods start on the 1st or 16th of each month and end on the 15th or end of the month (example: June 1-15 or June 16-30).

SSN: your social security number

Name: full name

Division: Commercial Fish

In the actual timesheet table fill in the following items:

Day: Monday, Tuesday, etc.

Date: 6/16, 6/17, etc.

Hours worked box: start and stop time in military time.

Code 1: fill in the number of hours worked for that day (see example in Appendix D.2.).

Work hours and Code 1 Totals should both equal the sum of daily hours worked. If your time sheet is sent in before the end of the pay period, project your time for the remaining days so you can total your columns.

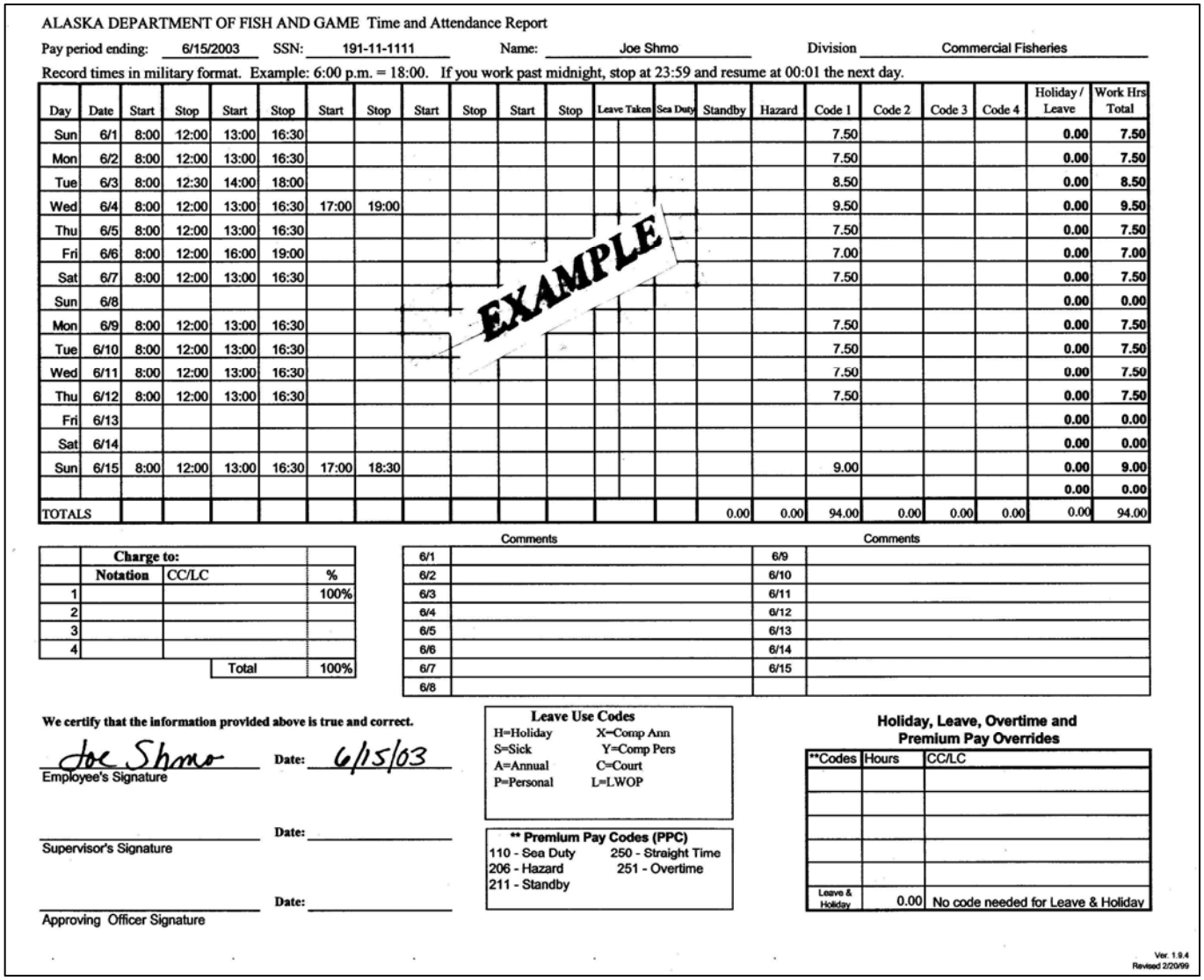
Charge to Table located on the bottom left hand side of the time sheet should be left blank unless otherwise instructed by your project supervisor.

Comments Table located on the bottom right hand side of the time sheet should be left blank unless otherwise instructed by your project supervisor.

Employee's signature and date: Be sure to sign and date your timesheet.

Crew leaders are responsible for reviewing each crew member's timesheet before sending them to town to ensure that they are properly filled out.

Appendix F 2.-Example of a completed timesheet.



ALASKA DEPARTMENT OF FISH AND GAME Time and Attendance Report

Pay period ending: 6/15/2003 SSN: 191-11-1111 Name: Joe Shmo Division Commercial Fisheries

Record times in military format. Example: 6:00 p.m. = 18:00. If you work past midnight, stop at 23:59 and resume at 00:01 the next day.

Day	Date	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Leave Taken	Sea Duty	Standby	Hazard	Code 1	Code 2	Code 3	Code 4	Holiday / Leave	Work Hrs Total
Sun	6/1	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Mon	6/2	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Tue	6/3	8:00	12:30	14:00	18:00											8.50				0.00	8.50
Wed	6/4	8:00	12:00	13:00	16:30	17:00	19:00									9.50				0.00	9.50
Thu	6/5	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Fri	6/6	8:00	12:00	16:00	19:00											7.00				0.00	7.00
Sat	6/7	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Sun	6/8																			0.00	0.00
Mon	6/9	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Tue	6/10	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Wed	6/11	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Thu	6/12	8:00	12:00	13:00	16:30											7.50				0.00	7.50
Fri	6/13																			0.00	0.00
Sat	6/14																			0.00	0.00
Sun	6/15	8:00	12:00	13:00	16:30	17:00	18:30									9.00				0.00	9.00
																				0.00	0.00
TOTALS														0.00	0.00	94.00	0.00	0.00	0.00	0.00	94.00

EXAMPLE

	Charge to:		
	Notation	CC/LC	%
1			100%
2			
3			
4			
		Total	100%

	Comments		Comments
6/1		6/9	
6/2		6/10	
6/3		6/11	
6/4		6/12	
6/5		6/13	
6/6		6/14	
6/7		6/15	
6/8			

We certify that the information provided above is true and correct.

Joe Shmo Date: 6/15/03
Employee's Signature

Date:
Supervisor's Signature

Date:
Approving Officer Signature

Leave Use Codes

H=Holiday	X=Comp Ann
S=Sick	Y=Comp Pers
A=Annual	C=Court
P=Personal	L=LWOP

**** Premium Pay Codes (PPC)**

110 - Sea Duty	250 - Straight Time
206 - Hazard	251 - Overtime
211 - Standby	

Holiday, Leave, Overtime and Premium Pay Overrides

**Codes	Hours	CC/LC
Leave & Holiday	0.00	No code needed for Leave & Holiday

Ver. 1.9.4
Revised 2/20/99

Chignik Lagoon Sockeye Salmon Test Fishery Operational Plan, 2007

By

Mark A. Stichert

April 2007

Alaska Department of Fish and Game **Division of Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

CHIGNIK LAGOON SOCKEYE SALMON TEST FISHERY OPERATIONAL PLAN, 2007

by

Mark A. Stichert

Alaska Department of Fish and Game
211 Mission Road
Kodiak, Alaska 99615

April 2007

The Regional Information Report Series was established in 1987 and was redefined in 2006 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric, and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: http://www.sf.adfg.ak.us/statewide/divreports/html/intersearch.cfm.

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ABSTRACT

The Alaska Department of Fish and Game (AGF&G) annually conducts test fisheries in Chignik Lagoon primarily to determine the relative abundance of Chignik River-bound sockeye salmon *Oncorhynchus nerka* prior to the first commercial salmon fishery in the Chignik Management Area (CMA). To conduct test fisheries, the department charters interested local fishing vessels from the Chignik Area and follows established test fishing protocols. This report documents the purpose of test fishing in Chignik Lagoon and summarizes the specific procedures for the Chignik Test Fishery Program.

Key words: Chignik Management Area, Chignik Lagoon, test fishery, sockeye salmon, salmon management

INTRODUCTION

Commercial salmon fishing periods in the Chignik Management Area (CMA) are primarily based on achieving Chignik River sockeye salmon *Oncorhynchus nerka* interim escapement objectives throughout the season. Sockeye salmon return to the Chignik River in two distinct, but overlapping runs; the early run which returns primarily to Black Lake during June, and the late run which returns primarily to Chignik Lake during July.

To ensure the interim objectives for both runs are achieved, the Alaska Department of Fish and Game (ADF&G) uses the Chignik River weir to evaluate escapement in addition to assessing run strength using commercial catch data. When catch data are not available due to commercial fishery closures, test fisheries are conducted to evaluate inseason run strength in the Chignik Lagoon.

Prior to the 2003 season, the Chignik Area Salmon Management Plan (5 AAC 15.357) required 40,000 sockeye salmon to have passed the Chignik River weir, and a significant buildup of salmon to be present in Chignik Lagoon before opening the commercial salmon fishery. In December of 2002, the Alaska Board of Fisheries (BOF) amended the Chignik Area Cooperative Purse Seine Salmon Fishery Management Plan (5 AAC 15.359) to withdraw this requirement in years during which there was a cooperative fishery. This was in response to concerns that with a reduced fleet size, fishermen would not be able to harvest excess salmon if a buildup developed. It also addressed the concern that product quality decreases when large amounts of fish are harvested in a short time period. However, at the November 2004 BOF meeting subsistence fishermen mentioned that, without an escapement threshold, they were not able to adequately plan subsistence fishing prior to the first commercial salmon fishery. In response, the BOF changed the opening criteria (5 AAC 15.357 (b)(1)) to allow a commercial salmon fishery when there is an expectation of 20,000 sockeye salmon escaping into the Chignik River. Based on this regulation, the department conducts a test fishery in Chignik Lagoon during early June to assess the early-season run strength of the sockeye salmon returning to the Chignik River.

GOALS

The CMA test fishery program has the following goals:

1) Obtain relative abundance estimates of sockeye salmon in Chignik Lagoon, and
2) Provide partial funding for the management of the Chignik Area salmon fishery.

2007 TEST FISHERY

ESTABLISHMENT OF CHARTER VESSEL SELECTION LIST

To conduct test fisheries, the department charters commercial fishing vessels from the Chignik Area. A list of vessel operators interested in participating in the program will be established prior to all test fisheries. The initial enrollment period will open on approximately May 15 and will close just before the first test fishing date. Interested vessel operators can enroll by calling the Chignik weir at 845-2243 during this period. At the close of this initial enrollment period, the department will perform a random drawing to determine the sequence of the participating vessel operators. This sequential list will be maintained throughout the season. Additional vessel operators may enroll after the initial enrollment and drawing; however, these operators will be placed at the end of the established list in the order they are received. If a vessel operator is unable to participate when their opportunity arises, the department will contact the next vessel operator on the established list. The vessel operator that was unable to participate will be reassigned to the bottom of the established list.

REQUIREMENTS FOR CHARTER CONTRACT

Fishermen wishing to participate in the department's test fishing program must agree to the terms of the department's short term vessel charter agreement (Appendix A1) and meet the following minimum requirements. Vessel operators must have a minimum of three years commercial fishing experience within Chignik Lagoon. All vessels must contain sufficient ice or a refrigerated seawater (RSW) system to chill the catch. Legal Chignik Lagoon seine gear is required, as is vessel compliance with U.S. Coast Guard safety regulations and insurance requirements.

A Chignik Commercial Fisheries Entry Commission (CFEC) permit is not required as the department is chartering the vessel and operating under the department's test fishing permit. An ADF&G observer will be onboard the test fishing vessel for the duration of the charter. Vessel operators are required to complete two forms: 1) *Field Purchase Order* (Figure 1), and 2) *State of Alaska Short Term Vessel Charter Agreement* (Appendix A1). Test fishing vessel operators will be paid $1,800 per day to cover the boat, crew, fuel, lubricants, gear, and transportation of the catch to the appropriate processor.

TEST FISHING SCHEDULING

The department will schedule the time and date of the 2007 sockeye salmon test fishery based upon inseason data and funding requirements. The first test fishery is expected to take place on or about June 2. Subsequent test fishing may be necessary during times when harvest data are not available due to extended closures or low fishing effort.

SEINING PROCEDURES

Department policy requires notification of the U.S. Coast Guard (USCG) prior to beginning test fishing activities. Chignik weir staff will contact Dave Mitchell by phone (465-4131) or e-mail (dave_mitchell@fishgame.state.ak.us) to provide the name of the fishing vessel, the duration, and location of the charter. This information will then be provided to the USCG.

The set locations for the test fishery are distributed throughout Chignik Lagoon (Figure 2). Typically, the first set is made at Mensis Point (1) and the last set is made at Ocean Beach (8). The alternative site location (Figure 2) will be fished when it is determined by the vessel operator

and department observer that seas are too rough to fish the Ocean Beach site. Department staff will meet the charter vessel near the location of the first set on a morning flood tide. The first set will be made as soon as the vessel operator determines there is enough water to make the set. The seine will be fished for 10 minutes, as measured from the time the skiff begins pulling the net off the deck of the fishing vessel to the time the skiff returns the net back to the vessel. The skipper and the biologist will estimate the number of sockeye salmon caught. The biologist will record the estimate of catch at each location on the *Chignik Lagoon Test Fishery Data Form* (Figure 3).

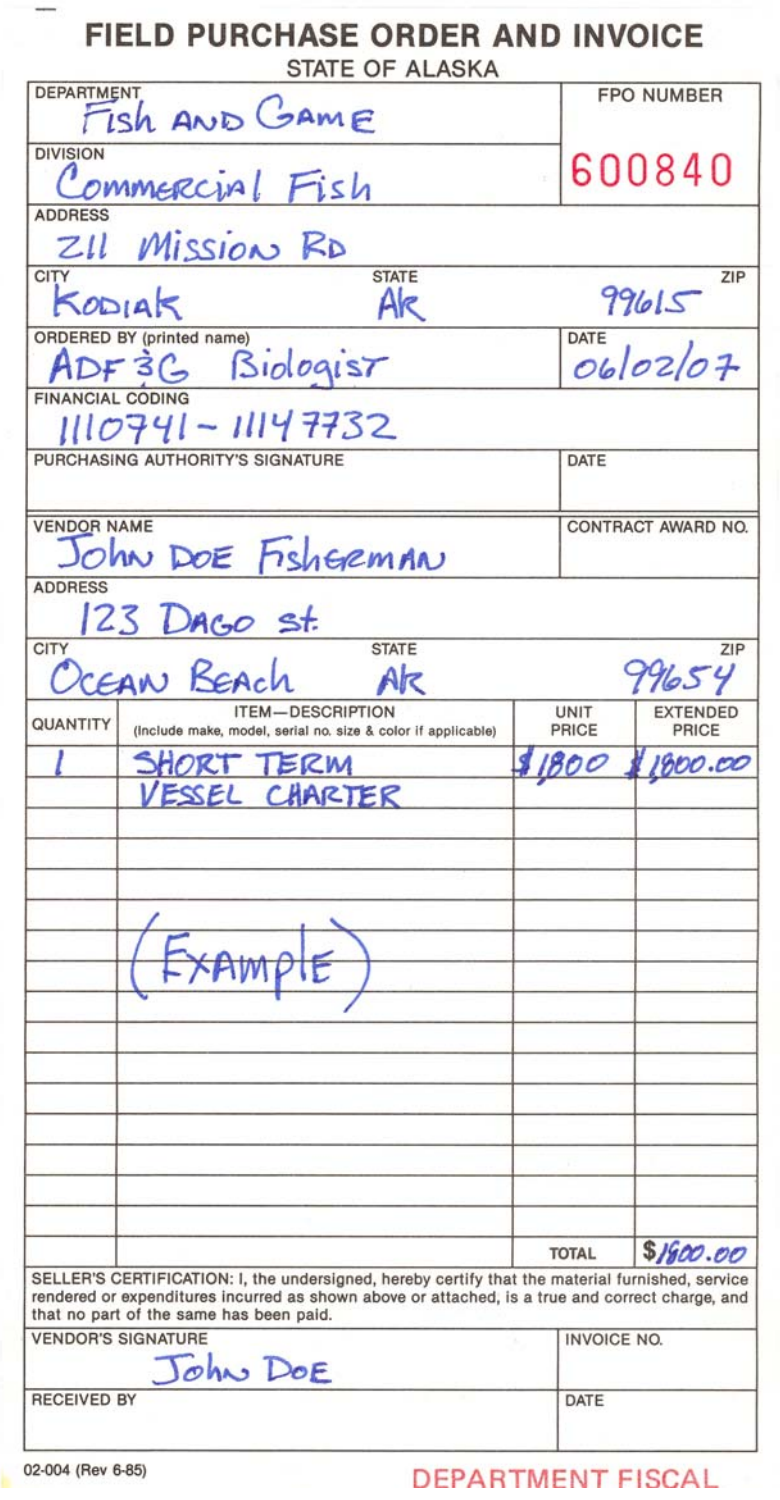
Upon completion of the final set, the vessel will transport the catch to a processor. All fish are sold using the department's test fish permit card and the revenue will be deposited into the Chignik Test Fish Account.

DATA ANALYSIS

Chignik management biologists use information collected from the test fishery in conjunction with escapement data to estimate sockeye salmon abundance. The following factors are considered when estimating abundance: 1) environmental and tidal conditions, 2) observed sockeye salmon activity, 3) abundance estimate from the vessel skipper and onboard biologist, and 4) test fishery catches and escapement estimates from previous years.

The department will distribute the results of test fishing activities with a news release at the end of each test fishery and during regularly scheduled radio updates.

FIGURES



FIELD PURCHASE ORDER AND INVOICE

STATE OF ALASKA

DEPARTMENT: Fish and Game

FPO NUMBER: 600840

DIVISION: Commercial Fish

ADDRESS: 211 Mission Rd

CITY: Kodiak STATE: AK ZIP: 99615

ORDERED BY (printed name): ADF&G Biologist DATE: 06/02/07

FINANCIAL CODING: 1110741 - 1114 7732

PURCHASING AUTHORITY'S SIGNATURE: DATE:

VENDOR NAME: John Doe Fisherman CONTRACT AWARD NO.:

ADDRESS: 123 Dago St.

CITY: Ocean Beach STATE: AK ZIP: 99654

QUANTITY	ITEM—DESCRIPTION (Include make, model, serial no. size & color if applicable)	UNIT PRICE	EXTENDED PRICE
1	SHORT TERM VESSEL CHARTER (Example)	$1800	$1800.00
		TOTAL	$1800.00

SELLER'S CERTIFICATION: I, the undersigned, hereby certify that the material furnished, service rendered or expenditures incurred as shown above or attached, is a true and correct charge, and that no part of the same has been paid.

VENDOR'S SIGNATURE: John Doe INVOICE NO.:

RECEIVED BY: DATE:

02-004 (Rev 6-85)

DEPARTMENT FISCAL

Figure 1.-Example of a State of Alaska Field Purchase Order.

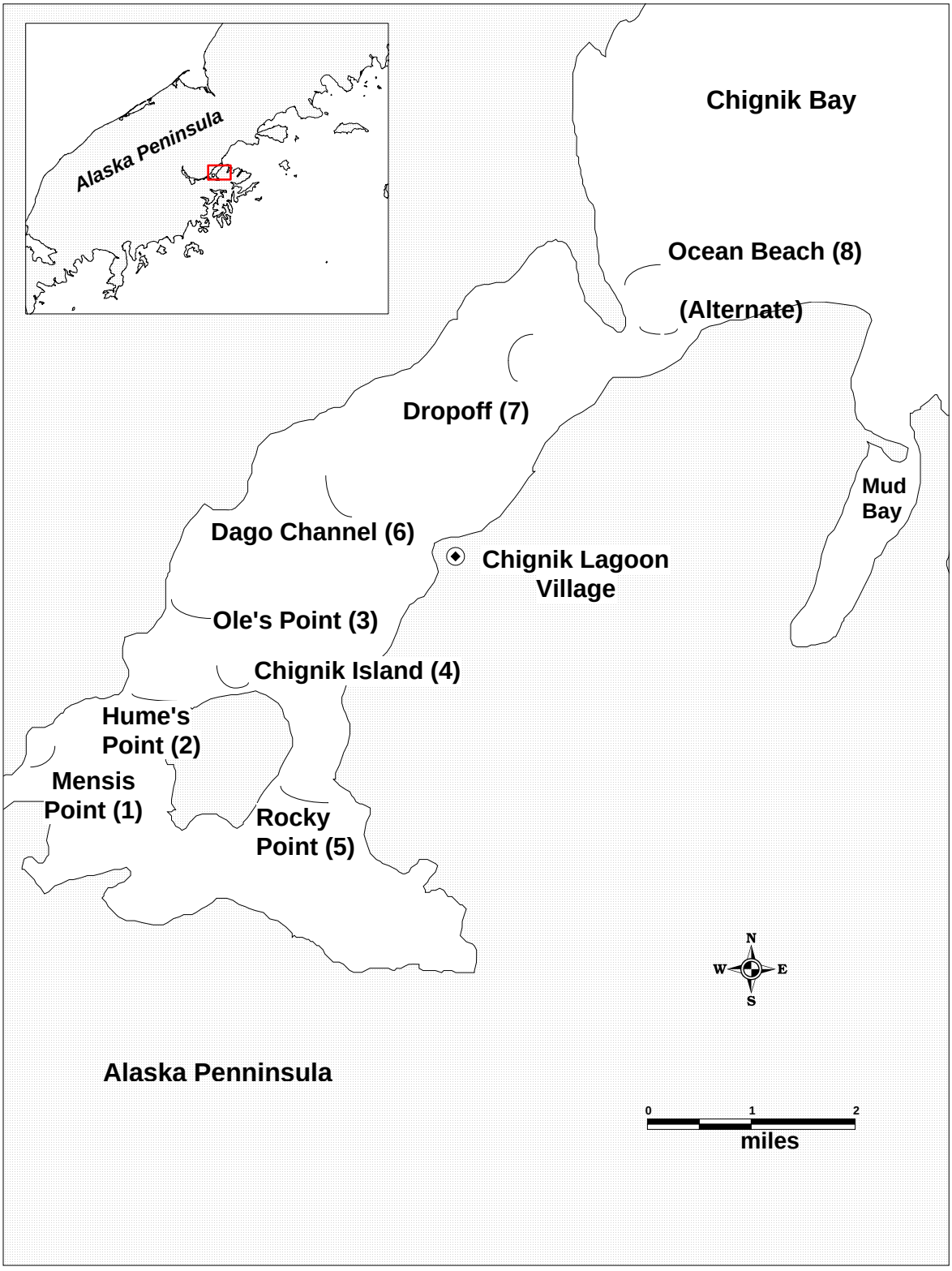


Figure 2.-Chignik Lagoon test fishing locations.

rev 3/05 Page ___ of ____

Chignik Lagoon Test Fishery Data Form

Date_____ Kodiak High Tide Vessel_____

Time_____ Observer_____

Height_____ Processor_____

SET _____ Lat._____ Long._____

Wind dir/vel_____ H20 Temp_____ Cloud Cover_____

Time Out_____ Time Closed_____

Catch

	Caught	Sold
Sockeye		
Chinook		
Pink		
Chum		
Coho		
Total		

Bycatch

	Caught	Sold
Total		

Comments:

SET _____ Lat._____ Long._____

Wind dir/vel_____ H20 Temp_____ Cloud Cover_____

Time Out_____ Time Closed_____

Catch

	Caught	Sold
Sockeye		
Chinook		
Pink		
Chum		
Coho		
Total		

Bycatch

	Caught	Sold
Total		

Comments:

Figure 3.-Chignik Lagoon test fishery data form

APPENDIX A: STATE OF ALASKA SHORT TERM VESSEL CHARTER AGREEMENT.

Appendix A1.-State of Alaska Short Term Vessel Charter Agreement.

120-14

STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
SHORT TERM VESSEL CHARTER AGREEMENT

This agreement shall cover chartering of the vessel described and under the conditions set forth below between the State of Alaska, Department of Fish and Game and:

Name _____ Mailing Address _____
City/State/Zip_____
Telephone _____

VESSEL

Name and/or Number_____ Type & Keel Length_____

Equipment & supplies provided by contractor (food, bait, skiff, etc.)

_____

Fishing gear provided by contractor _____

Fuel _____ will be _____ will not be provided by the State of Alaska

PURPOSE OF CHARTER _____

_____

Charter will begin at_____on_____and end at_____on_____
(location) (date) (location) (date)
(Cannot exceed fourteen (14) working days. No extension or sequential contract allowed)

Cost of Charter $_____ (Cannot exceed $30,000 total)

TERMS AND CONDITIONS

1. The State will have general direction over activities of the vessel, but contractor (if aboard) will be responsible for safe operation of vessel.

2. The Contractor will hold the State harmless from any liability caused by loss of vessel or damage caused to or by the vessel, and against any loss, damage and/or liability occasioned by or arising from any negligent act on the part of the Contractor.

3. The State will provide insurance coverage for state employees only.

4. The length of charter shown above is estimated and can be terminated at any time by the State but cannot exceed fourteen (14) working days.

5. Vessel may be required to submit to an inspection by the U.S. Coast Guard (State's option).

6. Upon completion of contract, Department of Fish and Game representatives will issue an FPO for payment processing. A warrant will be mailed to the above address after processing.

Continue on reverse side
11-071 (Rev. 11/86)(front)

-continued-

120-15

7. Special conditions _____

_____

The terms and conditions on reverse side are understood and agreed to.

/s/_____ /s/_____
Representative Owner or Master of Vessel
Department of Fish and Game

INSURANCE INFORMATION

1. Value of hull insurance $_____
2. Amount of protection and indemnity insurance $_____
3. Name of insurance carrier _____
4. Expiration date of policy _____
5. Number of Contractor's crew _____
6. Names of Department of Fish and Game personnel aboard:

_____

_____

_____

(back)

-continued-

120-18

LETTER OF INSPECTION

This letter expires _____

The vessel_____ , official number _____ ,
was inspected by the UNITED STATES COAST GUARD and was found to be in compliance with applicable inspection criteria approved jointly by the Alaska Department of Fish and Game and the United States Coast Guard. The vessel is considered satisfactory for operation during the period of charter in the area of _____

_____

It is understood that a maximum of _____ vessel crew members and _____ State personnel will be carried on board, for a total of _____ persons.

PRIMARY LIFESAVING EQUIPMENT	PORTABLE & FIXED FIRE EXTINGUISHING
_____	_____
_____	_____
_____	_____

Port vessel inspected at: _____ Date_____

SIGNED:

_____ USCG_____
Vessel Owner Officer in Charge, Marine Inspection

Inspection Zone:_____

Chignik Weir SCUBA Diving Operational Plan, 2007

by

Mark A. Stichert

April 2007

Alaska Department of Fish and Game **Division of Commercial Fisheries**

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

CHIGNIK WEIR SCUBA DIVING OPERATIONAL PLAN, 2007

by

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The Regional Information Report Series was established in 1987 and was redefined in 2006 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric, and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: http://www.sf.adfg.ak.us/statewide/divreports/html/intersearch.cfm.

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ABSTRACT

The Alaska Department of Fish and Game conducts non-scientific diving at the Chignik weir for the installation, removal, recovery, and maintenance of weir components. All dive projects conducted by the department fall under the authority of the Occupational Safety and Health Administration and the department's Dive Safety Board, which governs dive safety policies, training, and equipment. This document provides Chignik weir divers with the specific regulations, restrictions, and emergency procedures for all dive activities at the weir.

Key words: Chignik, weir, diving, scuba, Dive Safety Board, standards

INTRODUCTION

Accurate inseason monitoring of salmon escapement is necessary for the management of commercial and subsistence salmon fisheries in the Chignik Management Area. To obtain escapement estimates, the Alaska Department of Fish and Game (ADF&G) constructs and operates a large unconventional weir across the Chignik River. The depth of the Chignik River at the weir location ranges from 2-15 feet, and fluctuates daily depending on tides, watershed runoff, and wind direction. Therefore, Self-Contained Underwater Breathing Apparatus (SCUBA) diving at the Chignik weir is necessary for the installation, removal, and maintenance of weir components.

The only ADF&G dive project in the Westward Region occurs at the Chignik weir. Weir diving is atypical of open-water diving because divers are virtually never in a free-swimming state. The divers support themselves against the current by lying or standing on the weir panels or by standing on the river bottom. However, strong currents and the angle of the weir panels typically force divers to the surface. As a result, buoyancy control is either highly positive to remain on the surface or highly negative to stay in contact with the weir or the river bottom. Maximum depth is usually less than 15 feet and accurate 'bottom times' (dive times at depth) are difficult to determine because divers typically spend considerable time at the surface.

REGULATIONS

Most ADF&G dive projects are exempt from federal Occupational Safety and Health Administration (OSHA) SCUBA regulations because they qualify for a scientific diver exemption. The scientific diver exemption allows the ADF&G to form a Dive Control Board (DCB) and regulate their own safety practices. However, weir diving does not entirely qualify for this exemption because conducting scientific observations or recording data is not the primary purpose for SCUBA diving at the Chignik weir. Thus, the DCB oversees some aspects of weir diving operations while OSHA regulations govern the rest. All DCB and applicable OSHA policies for ADF&G dive activities are published in the statewide Dive Safety Manual (Hebert 2006).

At Chignik, diving is necessary to construct, maintain, or remove the structures, devices, and materials associated with the Chignik weir. Therefore, weir diving standards must comply with the OSHA regulations for commercial diving construction practices (29 CFR, subpart T, section 1910.401 - 1910.440; OSHA 2003). However, weir diving differs from typical underwater construction (which is further restricted) in its simplicity and scale; materials are pre-fabricated and only basic assembly with simple fasteners is required. Additionally, no underwater welding is performed, and no power equipment is used by Chignik weir divers. All weir diving must be conducted within 100 feet of the weir in depths similar to those found at the weir.

DIVE PLAN

DIVING RESTRICTIONS

Since weir divers do not qualify as scientific divers, ocean, lake, or other departmental diving activities will not be allowed unless approved by the ADF&G Local Dive Safety Officer (LDSO). Any non-weir departmental SCUBA diving must be done in accordance with OSHA regulations and under ADF&G auspices.

AUTHORIZED CHIGNIK WEIR DIVERS

Mark Stichert, the Chignik Area Management Biologist, and Westward Region LDSO will serve as the lead diver at the Chignik weir during 2007 season. The lead diver shall follow the approved dive plan and is responsible for the proper operation and maintenance of all dive and safety equipment and coordinating all dive activities at the weir. All weir divers are required to read this diving plan, the ADF&G Dive Safety Manual, OSHA dive regulations, and any other information recommended by the LDSO.

The DCB recommends that all ADF&G divers complete a minimum of six proficiency dives during the off season. If a weir diver is unable to complete this requirement prior to returning to Chignik, then that diver is required to do a checkout dive at the Chignik weir under the direction of the LDSO. The Chignik weir checkout dive sheet is found in Appendix A1. Personal recreational diving can satisfy the minimum proficiency dive requirements, and is encouraged.

SAFETY PROCEDURES

All employees, including divers, at the Chignik weir are required to be currently certified in Cardio Pulmonary Resuscitation (CPR), First Aid, and emergency oxygen administration. All employees will be briefed with other dive specific emergency procedures and equipment as needed by the LDSO.

The proposed dive plan for the Chignik weir in 2007 is detailed in Table 1. All dives will follow limits established in standardized recreational dive tables (e.g., PADI Recreational Dive Planner). All ADF&G divers are additionally required to maintain personal dive logs. Dive logs will be reviewed by the LDSO before and after each field season to monitor safety and proficiency standards.

Two ADF&G certified weir divers must be on site prior to any SCUBA diving activities at the weir. Generally, one diver will be in the water and the other will serve as a dive tender. The dive tender shall be comparably SCUBA equipped and located either on the weir boardwalk immediately above, or in the water adjacent to the diver. Hand signals or a repeating series of three taps on any metal portion of the weir will be the signal that the diver needs immediate emergency assistance from the dive tender (Hebert 2006).

Medical grade oxygen cylinders and respirators, in a ready-to-use configuration, will be on site during each SCUBA dive and all Chignik weir staff must be trained in their use. A copy of the diving emergency management procedures (Appendix A2) with emergency first aid and contact information will be located near the phone in the ADF&G Chignik office.

Local residents routinely operate skiffs on the Chignik River. Before diving, a safety announcement must be made on VHF channel 6 to inform local boat traffic that a diver is in the water and caution should be exercised when traveling near the weir. Additionally, standard red and white SCUBA dive flags and life rings must be posted upstream and downstream of the

weir. When a diver is within 150 feet of the boat gate, they must be verbally alerted by the boat gate operator and dive tender prior to opening the boat gate. When the diver is within 50 feet of the boat gate, the diver must remain at the surface prior to and throughout the time the boat gate is open without exception. It is the responsibility of the individual operating the boat gate to verbally alert the dive tender, who is then responsible for alerting the diver. Boat passage will not be allowed until diver communication has been established and all conditions have been met.

Hypothermia may become a factor at any time while diving, especially during weir installation which occurs during mid-May when the water temperatures are relatively cold (usually 38° to 42° F). Divers are in the water much longer compared to normal open water diving situations and frequent periods of reduced diver activity can expose a diver to hypothermic conditions. Each diver must be aware of, and operate within, their individual limits. Dive tenders must be attentive and aware that hypothermia can affect behavior including judgement, speech, and motor skills.

In times of flooding and falling tides, the force of the current in the Chignik River can be significant. While diving near the open boat gate or open panel sections, the diver must use additional caution to avoid being swept downstream past the weir. In these situations, dive operations may be cancelled until conditions improve.

Normally, ropes, cables, and lines are not commonly encountered while diving at the Chignik weir. However, foreign debris may collect on the weir and the aluminum panels and camera gates may have sharp edges that could entangle or tear a diver's dry suit or gear. Therefore, a dive knife should be worn at all times by each diver.

EMERGENCY PLAN

General guidelines for managing dive emergencies are found in Appendix A2. In the event of any dive emergency, it is critical to seek qualified medical attention as soon as possible. The medical clinic at Chignik Lake Village should be the first point of contact during emergency situations (VHF channel 6 or phone (907) 845-2236). Inform clinic personnel that an underwater diving-related injury has occurred and medical oxygen may be necessary. If the injury potentially involves an air embolism (obstruction of a blood vessel by an air bubble or detached clot) or decompression illness take the diver to the clinic immediately and provide the clinic with the Divers Alert Network (DAN) phone number (919-684-8111) for additional dive-related medical assistance. If the injury is serious and/or life threatening, it is important that one person is designated to coordinate treatment and/or evacuation. If possible, treatment and evacuation plans should be coordinated through the Chignik Lake clinic and the US Coast Guard (USCG) flight surgeon. The flight surgeon and Kodiak USCG Search and Rescue can be reached at 1-800-478-5555 or (907) 487-5888.

EMERGENCY TRANSPORT

When coordinating an emergency evacuation, inform the Chignik Lake clinic and the USCG flight surgeon that department aircraft may be available to respond and transport the injured diver. To determine the location and response time of department aircraft, contact the ADF&G field offices in Chignik (907) 845-2243, Sand Point (907) 383-2066, Port Moller (907) 987-2216, or Cold Bay (907) 523-2419.

Other emergency evacuation options include: Peninsula Airways (Chignik: (907) 845-2228; King Salmon: (907) 246-3372; Cold Bay: (907) 532-2484) and the Alaska Regional Hospital

Life Flight (1-800-478-9111 or (907) 264-1899). The Life Flight plane is specialized and costly, but it may be the fastest way to get a patient to Anchorage. However, depending on conditions, Life Flight may not be able to land at the Chignik Lake air strip and it may be necessary to arrange alternative transport to King Salmon or Kodiak before transferring to the Life Flight aircraft for the remainder of the evacuation to Anchorage. Generally, it takes a minimum of four hours to reach a recompression chamber in Anchorage from Chignik. If possible, an ADF&G representative familiar with the injury should accompany the evacuated diver to the treatment facility.

It is critical to inform any air carrier that the injury is dive-related and medical grade oxygen must be available and administered to the patient continuously during the flight. It is also important to inform the evacuating plane to pressurize to sea level if possible. If the plane does not have this capability, request the pilot to fly as low as possible (no higher than 800 feet) to avoid further endangering the patient's life.

NEAREST HOSPITALS

Depending on the severity or type of dive injury, the patient may be transported to either Kodiak or Anchorage. A complete list of emergency medical and evacuation contacts is found in Appendix A2.

The nearest hospitals to Chignik are:

1. Providence Kodiak Island Medical Center, Kodiak, AK (907) 486-3281, 2-3 hours from Chignik (no hyperbaric facilities).
2. Alaska Regional Hospital Emergency Room, Anchorage, AK **(**907) 264-1222 or (907) 276-1131, 4-5 hours from Chignik (hyperbaric facilities).

HYPERBARIC (RECOMPRESSION) CHAMBERS

A doctor must refer a patient for any hyperbaric chamber treatment. The nearest hyperbaric chamber to Chignik is located at Comprehensive Medical Center in Anchorage, (907) 344-7775.

FAMILY CONTACTS IN CASE OF DIVER EMERGENCY

In any dive emergency or injury, the diver's family should be notified. Family contact information for each Chignik weir diver is on file with the LDSO.

INCIDENT REPORTING

All injuries, regardless of type or severity, must be reported to the employee's supervisor and an accident report form must be completed. All dive related injuries requiring recompression treatment or resulting in serious injury or death must be reported to the employee's supervisor, the LDSO, and the statewide Dive Safety Officer (DSO). The DSO or LDSO and the employee's supervisor shall investigate and document the incident, specifying the circumstances of the accident and the extent of injury/illness. The incident report must include a current State of Alaska Accident/Injury form, a description of symptoms, and the results of any treatment. The report will be filed with the DSO following standard State of Alaska accident/injury reporting protocols. Complete reporting requirements are outlined in the Dive Safety Manual (Hebert 2006). If the injury is pressure related, an American Academy of Underwater Sciences (AAUS) Accident or Incident Report Form (Appendix A3) must be completed.

EQUIPMENT

SCUBA EQUIPMENT

Dive equipment will be operated and maintained in accordance with the ADF&G Dive Safety Manual (chapter II, section 3; Hebert 2006) and OSHA standards (OSHA 2003).

SCUBA regulators (first and second stages) must be inspected and tested by a factory-authorized technician prior to first use and a minimum of every 12 months there after. Compressed air cylinders must have internal visual inspections (VIP) at least every 12 months and have a dated VIP sticker attached to each tank. In addition, compressed air cylinders require hydrostatic testing by a qualified technician in accordance with U.S. Department of Transportation standards once every five years. Pressure and depth gauges must be inspected and tested before first use and every 12 months thereafter. A record of testing, inspections, and repairs will be maintained by the LDSO.

A pressure gauge will be attached to all SCUBA tanks when in use and a minimum cylinder pressure of 500 pounds per square inch (PSI) must be maintained. Buoyancy compensation devices (BCDs) are optional for Chignik weir divers. BCDs increase resistance to the current and may hinder performance of a diver unnecessarily. However, an inflatable vest capable of maintaining a diver at the surface in a face-up position, equipped with a manually activated inflation source independent of the breathing supply (e.g. CO_2 cartridge), an oral inflation device, and an exhaust valve must be worn whenever a BCD is not used (OSHA 1910.430; OSHA 2003).

BREATHABLE-AIR COMPRESSOR

Only air compressor systems intended for breathable air will be used to fill SCUBA cylinders. Any person who fills tanks must first be trained in the use of the compressor by the LDSO or the lead diver in Chignik. Compressed air analyses must be performed on each department breathing air compressor at regular intervals of no more than 100 hours of operation or six months, whichever occurs first, or when the compressor is returned to service from storage. Air quality standards are listed in Table 2.

A maintenance log shall be maintained and attached to the compressor showing operation times, repairs, filter maintenance, air testing results, and temperature adjustments for the compressor. Only ADF&G SCUBA cylinders will be filled from the department's air compressor.

REFERENCE CITED

Hebert, K. 2006. Dive Safety Manual. Alaska Department of Fish and Game, Special Publication No. 06-39, Anchorage.

OSHA Office of Publications. 2003. 29 CFR part 1910 Commercial Diving Operations. Department of Labor, 200 Constitution Avenue, NW, Washington D.C. http://www.osha.gov/FedReg_osha_pdf/FED20030110.pdf.

TABLES

Table 1.-Proposed 2007 Chignik weir dive schedule.

Dive Type	Dive Location	Number of Proposed Dives	Average/ Maximum Depth (ft.)	Bottom Time (mins./dive)	Time in Water (hrs./dive)
Weir Installation	Weir	12	4 - 15	40	2.5
Weir Removal	Weir	4	4 - 15	30	2.5
Weir Maintenance	Weir	15-20	4 - 15	15	1.0
Gear Recovery	Chignik River	As Needed	4 - 15	10	0.5

Table 2.-Compressed Gas Association Grade E air quality standards.

Component	Maximum
Oxygen	20-22 %/volume
Carbon Monoxide	10 parts per million/volume
Carbon Dioxide	500 parts per million/volume
Condensed Hydrocarbons	5 milligrams/meter^3
Water Vapor	Not Specified
Objectionable Odors	None

APPENDIX A: MISC. DIVE INFORMATION

Appendix A1.-Chignik weir checkout dive.

'Weir Divers' should be able to demonstrate proficiency in the following skills during a checkout dive with the Local Dive Safety Officer (LDSO) or designee.

__ Knowledge of department diving standards and regulations

__ Pre-dive planning, briefing, site orientation, and buddy check

__ Equipment familiarity

__ Proper buddy contact

__ Monitor cylinder pressure

__ Weir dive skills:

- __ Shoreline entry
- __ Establish neutral buoyancy
- __ Stand/balance on weir against current
- __ Walk 25 feet along weir
- __ Alternate between snorkel and SCUBA
- __ Descend to bottom
- __ Remove mask, replace, and clear
- __ Remove regulator, recover, clear, and replace
- __ Simulate weight belt jettison
- __ Underwater swim/pull 25 feet along weir
- __ Ascend from bottom, practicing safe ascent
- __ Shoreline exit

__ Rescue briefing:

- __ Self-rescue techniques
- __ Tows of conscious and unconscious victim
- __ Simulated in-water rescue breathing

-continued-

__ Rescue of submerged non-breathing diver (including equipment removal, simulated rescue breathing, towing, and recovery to boat or shore)

__ Rescue of submerged pinned diver

__ Use of emergency oxygen on breathing and non-breathing victim

__ Accident management and evacuation procedures

Additional Training

__ Practice rescue of diver drifting downstream of weir (both self-rescue and with dive tender)

__ Dive tender training

__ Small boat handling

Appendix A2.-Diving emergency management procedures.

Introduction

A diving accident victim could be any person who has been breathing compressed air underwater regardless of depth. It is essential that emergency procedures are pre-planned and that medical treatment is initiated as soon as possible. It is the responsibility of each department diver to understand the procedures for diving emergencies, including evacuation and medical treatment, prior to diving.

General Procedures

Depending on and according to the nature of the diving accident, stabilize the patient, administer 100% oxygen, contact local Emergency Medical System (EMS) for transport to a medical facility, and contact a dive physician/recompression chamber as appropriate. Explain the circumstances of the dive incident to the evacuation teams, medics, and physicians. Do not assume that they understand why 100% oxygen may be required for the diving accident victim or that recompression treatment may be necessary.

1. Make appropriate contact with victim or rescue as required.
2. Establish (A)irway, (B)reathing, (C)irculation as required.
3. Administer 100% oxygen, if appropriate (in cases of Decompression Illness or Near Drowning).
4. Call local Emergency Medical System (EMS) for transport to nearest medical treatment facility.
5. Contact diving physician and recompression chamber as necessary.
6. Notify Dive Safety Officer (DSO) or designee.
7. Complete and submit Incident Report Form (Appendix A3) to ADF&G's Dive Safety Board and the AAUS.

List of Emergency Contacts:

Chignik Lake Medical Clinic.....(907) 845-2236 or VHF channel 6

Kodiak US Coast Guard Search and Rescue (flight surgeon).....800-478-5555 or (907) 487-5888

Alaska Regional Hospital Life Flight .....800-478-9111 or (907) 264-1899

Providence Kodiak Island Medical Center .....(907) 486-3281

Alaska Regional Hospital Emergency Room.....(907) 264-1222 or (907) 276-1131

Hyperbaric Chamber Nursing Supervisor.....(907) 264-1598

Comprehensive Medical Center, Anchorage (hyperbaric chamber).....(907) 344-7775

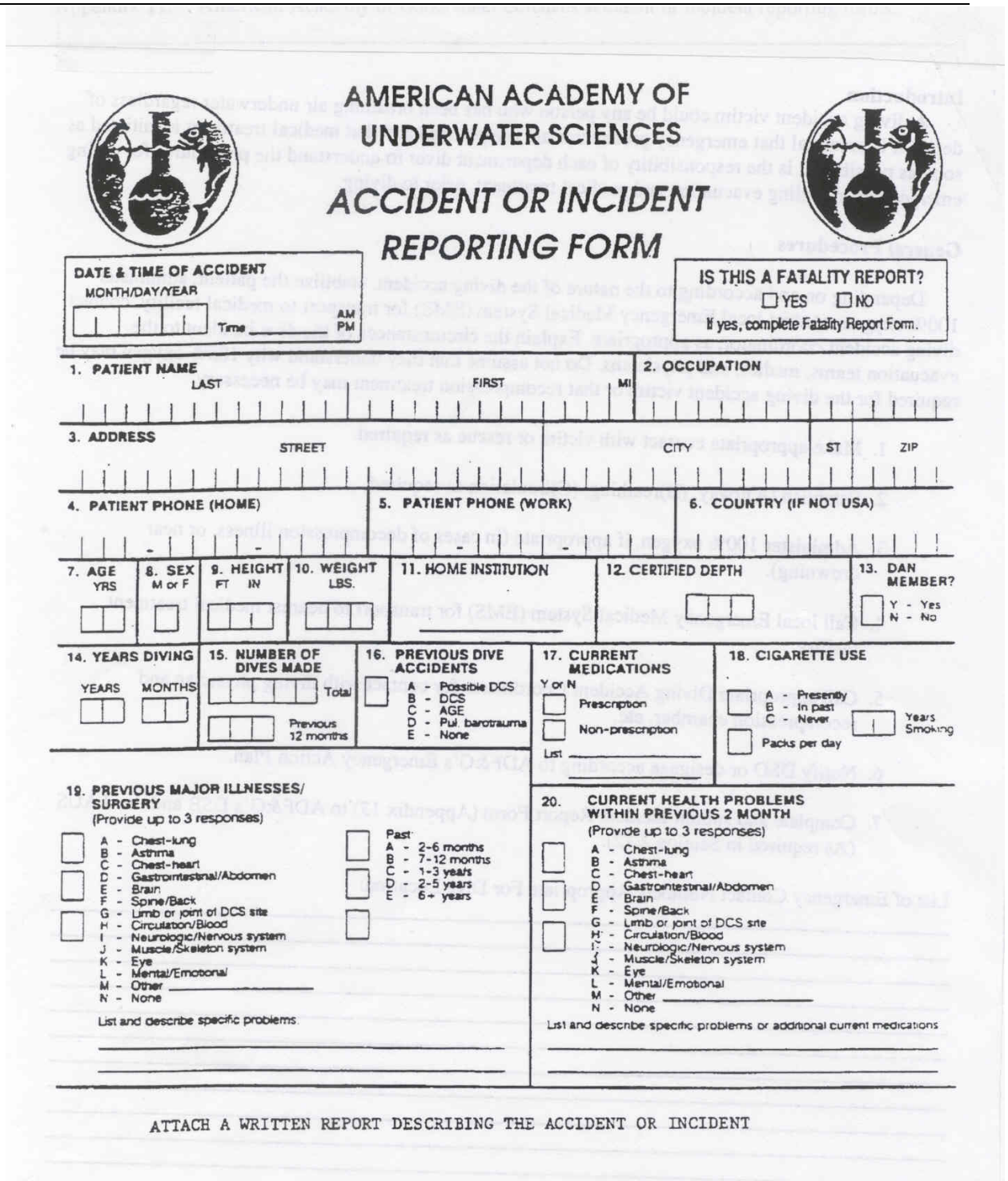
Divers Alert Network (DAN) 24-hour Emergency Line .....(919) 684-8111

Peninsula Airways .....(907) 845-2228 or (907) 246-3372

Kyle Hebert (ADF&G Dive Safety Officer).....(907) 465-4228

Mark Stichert (ADF&G Region IV Local Dive Safety Officer).....(907) 845-2243 (Chignik)

Appendix A3.-American Academy of Underwater Sciences, Accident or Incident Reporting Form.



AMERICAN ACADEMY OF UNDERWATER SCIENCES

ACCIDENT OR INCIDENT REPORTING FORM

DATE & TIME OF ACCIDENT
MONTH/DAY/YEAR
Time ____ AM PM

IS THIS A FATALITY REPORT?
☐ YES ☐ NO
If yes, complete Fatality Report Form.

1. PATIENT NAME LAST FIRST MI

2. OCCUPATION

3. ADDRESS STREET CITY ST ZIP

4. PATIENT PHONE (HOME) - -

5. PATIENT PHONE (WORK) - -

6. COUNTRY (IF NOT USA)

7. AGE YRS

8. SEX M or F

9. HEIGHT FT IN

10. WEIGHT LBS.

11. HOME INSTITUTION

12. CERTIFIED DEPTH

13. DAN MEMBER?
Y - Yes
N - No

14. YEARS DIVING
YEARS MONTHS

15. NUMBER OF DIVES MADE
Total
Previous 12 months

16. PREVIOUS DIVE ACCIDENTS
A - Possible DCS
B - DCS
C - AGE
D - Pul. barotrauma
E - None

17. CURRENT MEDICATIONS
Y or N
Prescription
Non-prescription
List

18. CIGARETTE USE
A - Presently
B - In past
C - Never
Packs per day
Years Smoking

19. PREVIOUS MAJOR ILLNESSES/ SURGERY
(Provide up to 3 responses)

A - Chest-lung
B - Asthma
C - Chest-heart
D - Gastrointestinal/Abdomen
E - Brain
F - Spine/Back
G - Limb or joint of DCS site
H - Circulation/Blood
I - Neurologic/Nervous system
J - Muscle/Skeleton system
K - Eye
L - Mental/Emotional
M - Other ____
N - None

Past:
A - 2-6 months
B - 7-12 months
C - 1-3 years
D - 2-5 years
E - 6+ years

List and describe specific problems:

20. CURRENT HEALTH PROBLEMS WITHIN PREVIOUS 2 MONTH
(Provide up to 3 responses)

A - Chest-lung
B - Asthma
C - Chest-heart
D - Gastrointestinal/Abdomen
E - Brain
F - Spine/Back
G - Limb or joint of DCS site
H - Circulation/Blood
I - Neurologic/Nervous system
J - Muscle/Skeleton system
K - Eye
L - Mental/Emotional
M - Other ____
N - None

List and describe specific problems or additional current medications

ATTACH A WRITTEN REPORT DESCRIBING THE ACCIDENT OR INCIDENT

-continued-

DIVE ACCIDENT OR INCIDENT

21. DIVE PLATFORM
A - Shore
B - Small boat
C - Research Vessel

22. DIVE ACTIVITY (up to 2 responses)
A - Collecting
B - Photography
C - Installing Equip.
D - Servicing Equip.
E - Observing
F - Under instruction
G - Providing instruction
H - Other_____

23. ENVIRONMENT
A - Freshwater
B - Saltwater

24. ALTITUDE OF DIVE
A - Sea Level
B - > Sea Level but < 1000 ft
C - > 1000 ft.

25. Was this dive or dive series typical of your normal type of diving?
Y - Yes
N - No
IF NO, Explain_____

26. DIVER'S PERCEPTION OF TEMPERATURE
A - Cold
B - Hot
C - Comfortable

27. CURRENT STRENGTH
A - Strong
B - Moderate
C - Mild
D - None

28. AIR SUPPLY
A - Scuba Air
B - Surface Supply Air
C - Mixed gas
D - None/Breath-hold dive

29. AIR CONSUMPTION
A - Ran low
B - Out of air
C - Not a problem
D - Buddy breathing (not octopus)

30. BUOYANCY PROBLEM
Y - Yes
N - No

31. RAPID ASCENT
Y - Yes
N - No

32. WITHIN LIMITS-Y or N
Tables (which table_____)
or
Computer (type_____)

33. TYPE OF SUIT
A - Wet
B - Partial Wet
C - Dry
D - Lycra
E - Swim

34. EQUIPMENT USED ON DIVE: (please check all that apply)
Depth gauge
Timing device/watch
Buoyancy vest
BC Inflator hose in use
Decompression computer

35. EQUIPMENT MALFUNCTION:
A - None
B - Regulator
C - BC Vest
D - Weight belt
E - Dry suit
F - DC Computer
G - Inflator hose
H - Contaminated air supply
I - Equipment was not familiar to you.
J - Other
Reason:_____

36. TYPE OF DIVE
Y - Yes
N - No
Single
Repetitive

37. WOMEN, PLEASE RESPOND (up to 2 responses)
When the accident occurred, were you:
A - Menstruating
B - On birth control medication
C - Pregnant
D - None of the above

38. DIVE LOCATION:
State, Province, or Island:_____
Country or nearest country:_____

39. How long ago was your last Dive Trip/Series?
Circle one:
Days Weeks Months

40. STRENUOUS EXCERCISE
Y - Yes
N - No
24 hours predive
During dive
6 hours postdive

41. PREDIVE HEALTH
A - Nausea/ vomiting
B - Hangover
C - Diarrhea
D - Other
E - No Problem

42. ALCOHOL
Please check:
Number of drinks, beers, or wine
None
Night Before
Predive
Between Dives
Post Dive

43. RECREATIONAL DRUG USE
Prior to, between, or after dive
Y - Yes
N - No

44. Do you consider yourself physically fit?
Y - Yes
N - No
Do you excercise on a weekly basis? (Y or N)
Days per week

45. FATIGUE OR LACK OF SLEEP PRIOR TO DIVE?
Y - Yes
N - No

46. DIVE SERIES

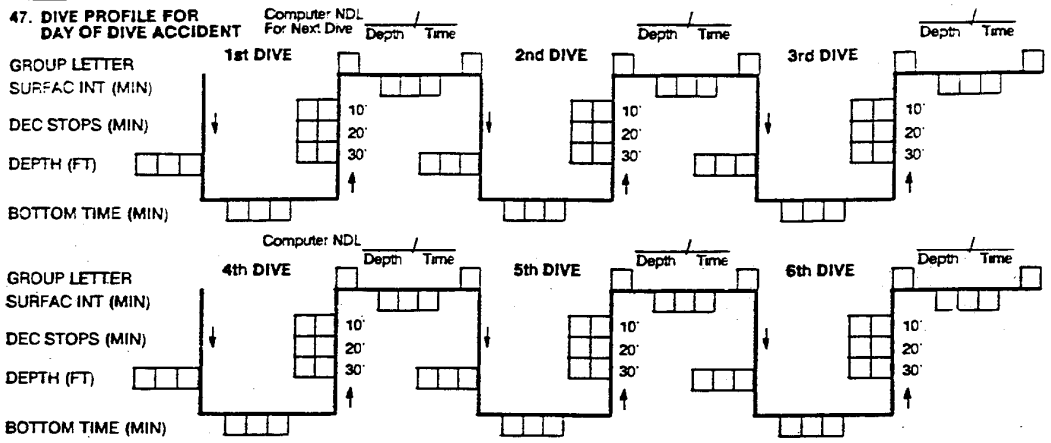
Please fill in all that apply up to and including your last dive. If you skipped a day please leave that day blank

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Total # of dives							
Any night dive? (How many)							
Any symptoms? (Y or N)							
A - All no stop dive(s) B - Any safety stop C - Any dive requiring decompression stops							
A - Multilevel (time divided) B - Square							
Deepest Dive (ft.)							

-continued-

DIVE ACCIDENT OR INCIDENT (con't)

47. DIVE PROFILE FOR DAY OF DIVE ACCIDENT



PRE-CHAMBER INFORMATION

48. INITIAL CONTACT WAS:

- A - DAN Emergency
- B - DAN Non-emergency
- C - Hospital emergency room
- D - Emergency medical service
- E - US Coast Guard
- F - Physician
- G - Dive instructor/shop
- H - Other _____

49. Total delay from symptom onset to contacting DAN or other medical help:

HOURS or DAYS

50. FLYING OR INCREASED ELEVATION AFTER DIVING AND PRIOR TO TREATMENT?

- A - Commercial airliner
- B - Unpressurized aircraft
- C - Med Evac Flight
- D - Mountain elevation
- E - Does not apply

Hours post dive (flew or went into elevation) _____

elevation (in feet) _____

51. SIGNS & SYMPTONS

1st Symptom _____
2nd Symptom _____
3rd Symptom _____
4th Symptom _____
5th Symptom _____
6th Symptom _____

- A - Pain
- B - Rash
- C - Itching
- D - Weakness
- E - Numbness/Tingling
- F - Dizziness/Vertigo
- G - Semi-consciousness
- H - Unconsciousness
- I - Restlessness
- J - Extreme fatigue
- K - Visual disturbance
- L - Speech disturbance
- M - **Headache**
- N - Paralysis
- O - Difficulty breathing
- P - Nausea/Vomiting
- Q - Hemoptosis/coughing blood from lungs
- R - Muscle twitching
- S - Convulsions
- T - Hearing loss
- U - Ringing ears
- V - Decreased skin sensation
- W - Bladder problem
- X - Bowel problem
- Y - Personality change
- Z - Difficulty walking standing
- 1 - Reflex change
- 2 - Other: _____

52. LOCATION: Block A = location of symptom
Then please check (✓)
L = Left R = Right B = Bilateral/Both Sides

	A	L	R	B
1st Symptom				
2nd Symptom				
3rd Symptom				
4th Symptom				
5th Symptom				
6th Symptom				

- A - Head
- B - Face
- C - Sinus
- D - Eyes
- E - Ears
- F - Neck
- G - Shoulder
- H - Entire arm
- I - Upper arm
- J - Elbow
- K - Forearm
- L - Wrist
- M - Hand
- N - Fingers
- O - Chest
- P - Back
- Q - Upper back
- R - Lower back
- S - Abdomen
- T - Buttock
- U - Groin
- V - Hip
- W - Entire leg
- X - Thigh
- Y - Knee
- Z - Calf
- 1 - Shin
- 2 - Ankle
- 3 - Foot
- 4 - Toes
- 5 - Trunk
- 6 - Generalized
- 7 - Other _____

53. SYMPTOM ONSET:

	HOURS	MINUTES	or	BEFORE SURFACING FROM DIVE
1st Symptom				
2nd Symptom				
3rd Symptom				
4th Symptom				
5th Symptom				
6th Symptom				

54. ANY OF THE SYMPTOMS FROM #51 PRIOR TO THE LAST DIVE?

Y - Yes
N - No

If yes, which symptoms?

1st _____
2nd _____
3rd _____
4th _____
5th _____
6th _____

Other _____

Explain _____

55. FIRST AID ADMINISTERED BEFORE HOSPITAL OR CHAMBER HELP WAS RECEIVED?

Y - Yes
N - No

- Oxygen
- Aspirin
- Oral fluids
- Head down position/ Trendelenburg

If oxygen was received was delivery by

- A - Demand valve
- B - Freeflow valve
- C - Don't know

- continued -

PRE-CHAMBER INFORMATION (cont.)

56. HOSPITAL TREATMENT ADMINISTERED

(Please check all that apply):

- ☐ None
- ☐ Oral fluids
- ☐ IV fluids
- ☐ Oxygen
- ☐ Steroids
- ☐ Anticoagulant
- ☐ Aspirin
- ☐ Other medication

_____

_____

57. RELIEF BEFORE CHAMBER TREATMENT?

☐

A - Complete
B - Partial
C - Temporary
D - None

59. PRE-CHAMBER RELIEF OCCURRED:

☐

A - Without first aid or medical care
B - Following first aid
C - Following pre-chamber hospital care
D - No relief occurred

58. IF ANY RELIEF OCCURRED, WHICH SYMPTOMS FROM #51 ABOVE?
(Please check):

- 1st ☐
- 2nd ☐
- 3rd ☐
- 4th ☐
- 5th ☐
- 6th ☐

CHAMBER TREATMENT

60. CHAMBER TREATMENT FACILITY LOCATION

CITY

STATE COUNTRY

Date & Time of Treatment

MONTH/DAY/YEAR

Time _____ AM PM

Name of hyperbaric facility

Treating doctor

Form Completed By

_____

61. TYPE OF CHAMBER
(please check)

Initial Treatment	Retreatment Chamber
☐ Monoplace	☐ Monoplace
☐ Dualplace	☐ Dualplace
☐ Multiplace	☐ Multiplace
☐ No chamber treatment given	

62. TOTAL DELAY FROM SYMPTOM ONSET TO RECOMPRESSION

HOURS ☐ or DAYS ☐

63. INITIAL TREATMENT

☐

A - USN TT4
B - USN TT5
C - USN TT6
D - USN TT6A
E - HART Protocol
F - KINDWALL Protocol
G - 45 fsw 90 min
H - 33 fsw 120 min
I - Other

_____

_____

64. TABLE EXTENSIONS REQUIRED?

☐

Y - Yes
N - No

66. RETREATMENT GIVEN
(Provide up to 3 responses)

TABLE	NUMBER OF TREATMENTS
☐	☐
☐	☐
☐	☐

A - USN TT4
B - USN TT5
C - USN TT6
D - USN TT6A
E - HART Protocol
F - KINDWALL Protocol
G - 45 fsw 90 min
H - 33 fsw 120 min
I - Other

_____

67. RELIEF AFTER HYPERBARIC THERAPY COMPLETED?

☐

A - Complete
B - Partial
C - Temporary
D - Hyperbaric therapy not completed
E - None

68. RESIDUAL SYMPTOMS AFTER HYPERBARIC THERAPY COMPLETED?

☐

A - Pain only
B - Neurologic
C - Hyperbaric therapy not completed
D - None

65. RELIEF AFTER INITIAL TREATMENT OF SYMPTOMS FROM # 51?

- 1st ☐
- 2nd ☐
- 3rd ☐
- 4th ☐
- 5th ☐
- 6th ☐

Please indicate:

A - Complete
B - Partial
C - Temporary
D - None

69. DURATION OF RESIDUAL SYMPTOMS

(Circle one)

☐

DAYS
WEEKS
MONTHS

70. FINAL DIAGNOSIS:

☐

A - DCS I
B - DCS II
C - Air Embolism
D - Pulmonary Barotrauma
O - Other

_____

_____

_____